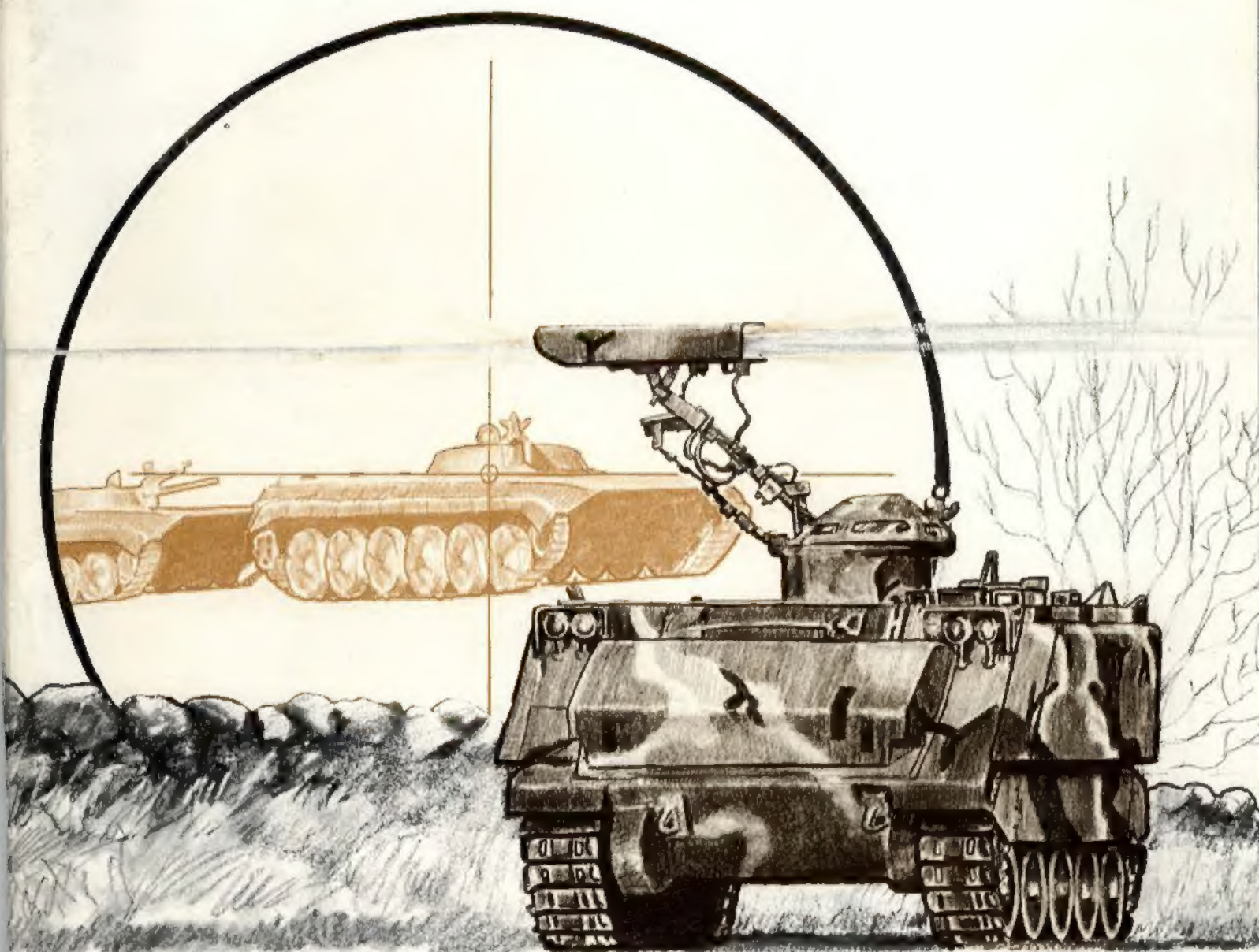


ARMOR

january-february 1976



TR O'NEILL

***Needed Now:
An Antiarmor Doctrine***

US Army Armor School

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"To disseminate knowledge of the military arts and sciences, with special attention to mobility in ground warfare; to promote professional improvement of the Armor Community; and to preserve and foster the spirit, the traditions and the solidarity of Armor in the Army of the United States."

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Cover

The TOW-equipped conceptual antitank vehicle drawn by Captain Timothy O'Neill is the nucleus of an antiarmor doctrine which he proposes in his article beginning on page 19.

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LETTERS

The M-60A2 Transition

Dear Sir:

Major Hubbard's article in your May-June 1975 issue was of special interest to the 1st Bn, 32d Armor, as we are in the middle of M-60A2 transition. I enjoyed the article very much, but much of what was said doesn't jive with what this battalion has experienced thus far.

Major Hubbard's article presupposes a problem that already exists in that the present turret maintenance system will not be able to support electronic turrets of the M-60A2 tanks. Only time can really tell, but some of his basis for argument appears faulty. The psychological barrier contention doesn't agree with what we've seen so far in transition. The mechanic doesn't normally need an innate understanding beyond simple troubleshooting steps found in the TM 20-2. Our maintenance experts feel the TM 20-2 on the M-60A2 is extremely good, up to date, and if used by the turret mechanic, leaves no necessity for reasoning beyond procedural steps. The problem will be in getting the turret mechanic to use the TM and learn for himself how good it is.

The fear of multiple failures and overlapping symptoms is remotely possible, but not probable. All of the turret subsystems naturally interface and work toward a common end, yet all are in fact subsystems within themselves with their own control boxes and wiring. Even with apparent multiple malfunctions, all that's required is to troubleshoot any one subsystem.

It is agreed that the motor sergeants need some basic understanding of the turret mechanic's job, just as any supervisor should know the jobs of the people who work for him. The need for a formal training program as opposed to "hands on" experience is debatable.

The availability of the necessary tool sets is hardly worth discussing because if they are on hand, they can be used. The only two test sets requiring calibration are the stabilization systems test set and the fire control test set. There are four of each on hand in the battalion (one each company and one in battalion maintenance). If we're so inefficient in that we can't stagger calibration dates, we deserve to be without. There are adequate numbers authorized and on hand in the battalion.

The example used by the author of loose cables to point out the inability of the test sets to diagnose malfunctions is very flaky. No test set can logically be expected to detect that problem. Even a TV repairman must plug the set in. Normal and correct procedures require that cable connectors and pins/sockets be checked prior to use of the test sets. The ability to use a multi-meter and the A2 test sets are all that is necessary to troubleshoot the A2 turret.

The suggestion that a chapter be added to the TM 20-2 on how the turret and components work would be redundant. The -10 already contains that information as well as the qualification procedure tables in the TM 20-2. The only thing not covered is how various electro and hydraulic components work and the requirement for this level of knowledge is questionable.

The suggestion to add additional slots for turret related personnel appears to have already been adopted. This battalion, by the new TOE, adds a 45Z40, E-6, Turret Mechanic Supervisor, to each tank company and a 45Z40, E-7, to battalion maintenance. I do feel we need these supervisors quickly at battalion maintenance. Three turret mechanics authorized in each company plus three more in battalion maintenance should be sufficient if we have the people on hand. It should not be necessary to add more slots.

In summary, we all must become familiar with the M-60A2 and the unique maintenance requirements of its turret. Incidentally, the picture on page 24 is not an M-60A2 turret.

JARRETT J. ROBERTSON

Major, Armor

3d Armored Div., APO 09074

Comments on Reader Survey

Dear Sir:

I noted the results of the Reader Survey (July-August 1975 issue) with interest and must say that it confirms my personal suspicions. Specifically, I am referring to the data associated with maintenance and logistics articles. While Tactics and Doctrine had an 81 percent high reader interest, Maintenance had 15 percent and Logistics had 3 percent. I just can't understand how anyone can expect to perform those fancy tactics if they can't MOVE, SHOOT, and COMMUNICATE. The only way you can do that is by having a good logistics

system and performing good maintenance.

Maybe I'm old fashioned but, ever since I stepped in front of that first platoon, my commanders have "beat me about the head and shoulders" about maintenance. Through the years, I have found that they have been right; you just can't function in any unit, regardless of size, without good maintenance.

The statistics of your survey indicate the conclusions that either the articles on maintenance and logistics were not written on subjects of interest to the readers, or the readers felt those subjects were not important enough compared to tactics. If the latter be true, it may be that this is indicative of our maintenance and logistics posture in the Army today.

Since your survey response was 44 percent from company grade officers, the future leaders of our Army, it appears that their reading interest might need jogging. I personally have found articles on these two subjects in *ARMOR* very interesting and most helpful. Logistics is near and dear to my heart because of the "guidance" by the commanders mentioned earlier.

JOHN F. LEHMANN

Lieutenant Colonel, GS

Fort Sam Houston, TX 78234

A Mechanic's Opinion

Dear Sir:

I looked over *ARMOR* magazine, and I cannot go along with most of the material in it. I have been a mechanic for 5 years now. I work on all tracked vehicles, and am in a position to say which vehicles are good for combat, and which ones are not.

I served in Germany for 3 years where we worked around the clock. We were in a STRIKE unit, where everything was A-B-C.

Now, as far as the M-60's and M-60A1 tanks go, they are one of the best combat vehicles we have. A different engine of better quality, and a better transmission is needed in the M-60's. As far as the gun goes, it's very good. It has a few bugs in the turret, but they can be worked out.

Now, as far as the M-551 Sheridan tank goes, it should be scrapped. It is very dangerous, has too many circuits, bad wiring, and cheap parts installed, and cannot be dropped from the air because of serious damage incurred.

The engine does not stand up and is geared wrong with the transmission that is used. The transmission is not too bad, but a few changes should be made.

The M-88 Recovery vehicle is a very good piece of equipment. It needs a few changes as far as the engine and transmission, but will do the job and more.

The M-578 is a piece of junk. The hydraulic system is no good, it needs engine and transmission changes, it's very noisy, and needs a heavier suspension system.

The M-109 is another piece of junk, inside and out. I could recommend many changes on this vehicle. It will not stay together, is constructed of cheap material, the engine's no good, and suspension too light.

The M-113 needs a better engine and transmission. The rest of it's OK, for what it's used for. The M-114 is not much better.

I could go on and on. As far as the M-60's and M-88's, they should be kept.

I have talked with many mechanics, with many years of experience, and they all agree. I have been to many Army schools, myself, and I think I have a good background on track vehicles — and it really gets to me the way the U.S. Army gets ripped off for the money that is spent for cheap equipment that is not meant to stay together. Let's not forget, a War is a WAR, anyway we look at it. We have the knowledge for better equipment, so let's build it and keep it for a time. Ask the MECHANIC, he can tell you what is a bad investment.

JAMES F. LEONE

Sergeant

Port Orchard, WA 98366

Correction

Dear Sir:

I would like to thank you for the fine spread you provided the XM-1 program in your November-December issue. There were two errors present, however, in the Tank System Comparative Characteristics table appearing on page 32 which I'm sure were apparent to most readers.

First, the height to the turret roof of the M-60A1 is 106 inches rather than the stated 128 inches which is the correct height including the cupola. Secondly, the acceleration category should have read 0-20 MPH instead of 0-30 MPH.

Thanks again for your fine article.

ROBERT K. NICHOLSON

Lieutenant Colonel, General Staff
Warren, MI 48092

Perspective

Dear Sir:

LTC O'Meara's article *Vietnam in Perspective* in the Nov.-Dec. issue was without a doubt the most scholarly — and constructive — essay that has appeared in any military journal for a long time. His perception and description of the roles of the military and journalism professions in our society provide a basis for us to understand the great antagonisms which grew out of our Vietnam involvement and which caused so much anguish to U.S. soldiers everywhere. It is a beautiful piece of work; I for one sincerely appreciate his taking the time to put it together and *ARMOR* for recognizing its great value and publishing it.

EUGENE J. STOKES, JR.

Colonel, Corps of Engineers
Fort Knox, KY 40121

"The Delta Troop Myth"

Dear Sir:

Brigadier General Bartley's "Professional Thoughts" ("The Delta Troop Myth," *ARMOR*, July-August 1975) were certainly thought provoking. Having served in a cavalry squadron that had lost its Delta Troop to division control, I feel that what the general has said is the reality of the situation, but not a reality that Armor officers should accept. This situation has developed because of the lack of professional knowledge (outside of MOS 1204 — Armor Reconnaissance Commander) of what to do with the cavalry squadron. In the classroom at Leavenworth, the cavalry squadron has become another combat maneuver battalion that certainly does not need an air cavalry troop. Yet, if the Armored Cavalry squadron is to adequately perform its role of reconnaissance and security on today's battlefield, it will need the capabilities of the Air Cavalry troop, just as the Air Cavalry troop needs the capabilities of a ground unit. Ground cavalry no longer enjoys a significant mobility differential over the support unit. Air cavalry provides this needed mobility differential. At the same time, air cavalry does not now have a real night or adverse weather operational capability. It will do the division commander little good to put air reconnaissance into an area only to lose continuity of the reconnaissance effort when the weather closes in, or when the sun sets. Ground and air cavalry under the same commander will provide this capability. While air cavalry has the ability to mass rapidly, these formations still do not have the sustained combat power nec-

essary to develop the situation for the supported commander. Armored cavalry, with air cavalry assets, has this capability.

Armor officers need to concern themselves with insuring that our service schools are teaching the proper use of the armored cavalry squadron, so that divisional staff officers and commanders will understand how to employ this valuable asset. We should not, as the general suggests, accept that the divisional cavalry squadron will routinely lose the operational control of its air cavalry troop as this will certainly degrade the capability of the squadron to perform its mission, and subsequently, will degrade the combat capabilities of the supported division.

ROBERT W. GARROTT, JR.

Major, Armor
Fort Ord, CA 93941

Dear Sir:

In your July-August 1975 issue, you published, under the title of "Professional Thoughts," an article entitled "The Delta Troop Myth," which was appalling. The inaccuracies by the author lead me to believe he knows little to nothing about cavalry. For example, he states that the armored cavalry squadron has nine scouts, when really the squadron has 10. He also states the squadron has 17 utility aircraft, when actually, it only has eight, and nothing is mentioned about the 10 gunships in the delta troop. A quick glance at FM 17-36 or FM 17-37 could have given that correct information.

It appears that the author does not realize that the cavalry squadron is part of the division base under the heading of combat troops, and the entire squadron is directly responsible to the division commander, unlike the other battalions that come under the direct control of a brigade commander. Rather than going into detail concerning the armored cavalry's diversified missions, I will simply say that the cavalry squadron provides reconnaissance and security for the division, and the delta troop is an absolute necessity in order for the squadron to properly perform its difficult task.

In regards to the author's comment about babysitting delta troop, the author should come to reality and realize that the cavalry squadron is the division commander's forward eyes and ears, not to mention the squadron's capability to fight.

JOE D. RASNICK

Captain, Armor

Fort Rucker, AL 36362

□



THE COMMANDER'S HATCH

MG DONN A. STARRY
Commandant
US Army Armor School

TANK DESIGN: OURS AND THEIRS

Part III — 1945-75

World War II clearly demonstrated that, in modern mechanized war, combined-arms action is one essential ingredient of winning. So dramatically was this lesson demonstrated in that war that after 30 years, the concept still forms the underlying operational bias of the world's major armies.

To the Soviets, World War II confirmed their view that numbers win. Today, their combined-arms armies are clear evidence that they espouse both numbers and combined-arms employment. In the late 1930's, viewing events of the Spanish Civil War, Stalin apparently purged his tank generals and adopted a revisionist tactical scheme using tanks primarily as support for infantry in guerilla war. Early German successes in the opening stanzas of World War II precipitated an abrupt Soviet reversion to their original German-inherited concepts of independent action by large armored formations.

American, British, French, and since the late 1950's, German armies, have been increasingly constrained by military budgets reduced to accommodate growing demands for socialization in other sectors of their respective societies. The growing realization that the West cannot hope to match Soviet numbers has led to wishful claims that superior technology would overcome superior numbers. That rationalization reflects in tanks of all three armies in different ways; it led to development of the world's most sophisticated tank, the German-American *MBT-70*; the *XM-803* American version was killed by a Congress that could not or would

not believe that tanks at so high a cost were affordable for any reason.

In America, notwithstanding the dramatically altered postwar world power balance, the United States continued to embrace the mobilization system as its basic military policy. As before, once mobilization was begun, the highly touted American production genius was to spew forth tanks and other war machines in overwhelming numbers. And so for different reasons, both Americans and Soviets intended to rely on numbers to win. The United States, although never officially saying so, soon realized the futility of trying to match Soviet numbers — a feat essential to the avowed national policy of containing Soviet expansionism. First it was said that nuclear weapons could make up for the disparity in ground combat power. When the Soviets themselves developed a tactical nuclear capability, it was rationalized in the U.S. that somehow sophistication would offset the Soviet numerical advantage.

In many ways too, tank development in the years since World War II has been characterized by the action-reaction process that drove tank design from 1940-1945. Each new development on one side has occasioned a reaction by the other side. Appearance of the Soviet *T-62* immediately following the deployment of the U.S. *M-60* to Europe in the early 1960's is illustrative.

The following chart describes the progression of tank models chronologically since 1945.

	ARMAMENT		POWER	SUSPENSION
	Primary	Secondary		
SOVIET				
PT-76	76.2-mm	1x7.62 mg	6 cylinder diesel, 260 h.p.	Torsion bar
T-54/55	100-mm	1x7.62 mg coax; 1x12.7 mg	V-12 diesel, 520 h.p. (T-54), 580 h.p. (T-55)	Torsion bar, flat dead track
T-10	122-mm	2x14.5 mg	V-12 diesel, 690 h.p.	Torsion bar w/7 double road wheels, 3 return rollers
T-62	115-mm (smoothbore)	1x7.62 mg coax	V-12 diesel, 580 h.p.	Torsion bar, flat dead track
U.S.				
M-47	90-mm	2x.30 mg; 1x.50 mg	810 h.p., V-12	Torsion bar
M-48	90-mm	1x.30 mg (A3; 1x7.62 mg) 1x.50 mg	825 h.p., V-12 gasoline (A3; 750 MP diesel)	Torsion bar
M-103	120-mm	1x.30 mg; 1x.50 mg	810 h.p., V-12 gasoline (later diesel)	Torsion bar
M-41	76-mm	1x.30 mg; 1x.50 mg	500 h.p., 6 cylinder opposed gasoline	Torsion bar
M-60A1	105-mm	1x7.62 mg; 1x.50 mg	750 h.p., V-12 diesel	Torsion bar
M-551	152-mm gun/ launcher	1x7.62 mg; 1x.50 mg	225 h.p., V-6 diesel	Torsion bar
M-60A2	152-mm gun/ launcher	1x7.62 mg; 1x.50 mg	750 h.p., V-12 diesel	Torsion bar
UK				
Centurion	105-mm	1x.30 mg; 1x.50 mg (ranging)	650 h.p., V-12 gasoline	Helical spring, suspended, dead track
Vickers MBT	105-mm	1x7.62 coax 1x.50 mg ranging	6 cylinder, vertical opposed tri-fuel	Torsion bar, suspended dead track
Chieftain	120-mm separate ammunition	2x7.62-mm mg	6 cylinder, vert-opposed, tri-fuel engine	Helical springs, suspended, dead track
Scorpion	76-mm	1x7.62 mg	6 cylinder gasoline, 195 h.p.	Torsion bar
Scimitar	30-mm Rarden	1x7.62 mg	6 cylinder gasoline, 195 h.p.	Torsion bar
FRANCE				
AMX-13	90-mm	2x7.62 mg	8 cylinder gasoline, 270 h.p.	Torsion bar, suspended dead track
AMX-30	105-mm	1x.50 mg; 1x7.62 mg	12 cylinder opposed diesel, 710 h.p.	
GERMAN				
Leo I	105-mm	2x7.62-mm	V-10 90° 4-stroke diesel, 830 h.p.	Torsion bar, suspended live track
Leo II	120-mm		V-12 multi-fuel, 1500 h.p.	Tube overbar
JAPANESE				
Type 61	90-mm	1x7.62 mg; 1x12.7 mg	V-12 diesel, 600 h.p.	Hydropneumatic variable suspension nonsupported, dead track
STB-1	105-mm	1x7.62 mg; 1x12.7 mg	V-10 90° diesel, 750 h.p.	
SWEDISH				
STRV (103)	105-mm	3x7.62 mg	6 cylinder diesel gas turbine	Hydropneumatic suspended dead track

Soviet Union. Soviet tank development progressed from the 1945 *T-34/85* through the *T-54/100*, *T-55/100* to the *T-62/115*. Each tank model incorporated product improved componentry of previous models. By 1960, the Soviets had abandoned the three-tank family idea in favor of lots of main battle tanks, and some light tanks for reconnaissance.

Guns became larger to satisfy the need for shaped-charge rounds in 4- to 5-inch diameters to defeat improved armor. The 115-mm smoothbore gun is an attempt to overcome inefficiencies of spin-stabilized *HEAT* rounds, and capitalize on development of a fin-stabilized hypervelocity round. With two major rounds not requiring spin for stabilization, a smoothbore gun became attractive.

The automotive plant grew from about 500 h.p. in the *T-34* to 580 h.p. in the *T-62*. The liquid-cooled, diesel-fueled, compressor-boosted start *T-62* engine was the same basic plant that first appeared in the *T-34* series.

Christie suspension and dead-link track continued as basic suspension characteristics. Snorkeling ability was added to enable the *breakthrough* attack to continue its momentum over Western Europe's large number of small watercourses. Positive pressure sealing against CBR attack followed on the advent of nuclear weapons.

Soviet obsession with low silhouette reflected in all models; it made for cramped fighting space inside and limited 4° gun depression — disadvantages on almost any terrain except the broad open steppes of Western Russia, where Soviet tank leaders fought most of their battles.

Smaller, lower, lighter than its potential adversaries, the *T-62*, with its excellent gun and proven automotive plant is at least a match for any other tank in the 1975 world tank inventory.

Soviet tanks are apparently developed by autonomous design groups who produce and field considerable numbers of prototypes before fixing on final design, and who rely heavily on product improvement of proven componentry in each succeeding design. Steadfast in operational concept and national military policy virtually since the beginning, driven by reward-punishment returns for success or failure in development, Soviet tank designers continue to field large numbers of relatively cheap, producible, good-enough systems.

Britain. British tank design since World War II demonstrates several unique distinguishing features

perhaps more dramatically than tank design in any other country. These features are:

- Extensive retrofit of existing basic design by adding improved components. *Centurion* tanks passed through 13 *Mark* numbers before giving way to *Chieftain*.
- Excellent guns of larger caliber, longer range, and with better fire control than almost any other tank gun. The 17 and 20 pounders (76- and 83-mm) mounted on Britain's 1945 tanks grew to 105-mm on late-*Mark Centurions* and gave way to 120-mm on *Chieftain*.
- Excellent and heavier armor protection than most other battle tanks.
- Less capable automotive plants in terms of horsepower and advanced engine design than other tanks.
- Track and suspension systems featuring large paired road wheel assemblies operating against hydraulic shock absorbers.

Consciously or not, British tank designers apparently decided early that gun performance and armor protection were more important to survivability than are agility-mobility. In part, this capitalizes on their ability to make good guns — better perhaps than any in the world. In part also, it reflects their late coming into high output diesel engines. Further, it suggests that British designers recognized that their forces would be severely budget constrained. Therefore, Britain's Army would always have to contend with Soviet numerical superiority with fewer, more survivable tanks.

In many ways, *Chieftain* is the world's best contemporary tank. Underpowered by the standards of many armies, it has excellent survivability afforded by good armoring and a superb long-range gun and fire control system.

The British have traditionally elected to use very light tanks and gunned armored cars for reconnaissance work and for operations in underdeveloped parts of the Commonwealth. Today's British light tank, *Scimitar*, successor to *Scorpion*, is part of a family of lightweight armored vehicles which the British believe necessary to support their national policy. For a light tank, *Scimitar* is really not much more agile than some medium tanks — showing again characteristic British automotive underpowering. It does, however, feature the excellent *Rarden* 30-mm cannon, demonstrating superior British gun-making abilities. Small in size and fairly agile because of its light weight, it probably enjoys con-

siderably more survivability than its armor thickness alone would suggest.

British tank design is centralized in the Military Vehicles Engineering Establishment. Headed by a civilian, this group is in operation much like autonomous Soviet design groups, with accommodation to a Western outlook on rewards and punishment. The MVEE developer and user work together to field new designs which are given thorough field trials by the user before acceptance.

Germany. The recreated German Army began tank operations with U.S. made *M-47's*, later *M-48's*. Resulting from a late 1950's joint effort by the Germans, French, and Italians which died aborning, Porsche built the first post-war German tank — *Leopard I*. The Bundeswehr fitted this tank with the British 105-mm gun; fire control, much like that of the U.S. *M-48*, and torsion-bar and live-track suspension adapted from the *M-48*.

LEOPARD I



Crew: 4
Armament: 105-mm gun, 2 mg Engine: V-10 diesel, 830 h.p.
Weight: 44.25 tons

Traditional German excellence in diesel engineering produced for *Leo I* a good diesel power plant that was linked to an efficient semi-automatic transmission. The German obsession with low silhouette already alluded to make for a low and sleek looking *Leo I*.

With its good gun, well formed armor and good mobility, *Leo I* was at least equal to its companion, the U.S. *M-60*, and a match for its adversary *T-55/T-62*.

In development, the prototype *Leopard II*, with its 1,800-h.p. liquid-cooled diesel engine, 120-mm smoothbore gun and improved fire-control system

LEOPARD II



Crew: 4
Armament: 120-mm gun, 2 mg Engine: V-12 multi-fuel,
1800 h.p. Weight: 55 tons

would give the Bundeswehr a tank more than a match for the *T-62*.

No single feature dominates *Leo II* at the expense of other desirable characteristics. It is rather a blend of gun-armor-mobility, each making a unique contribution to survivability. It is, however, expensive; current estimates indicating that for equal monies, one could buy three or four *T-62's* for the price of one *Leo II*.

France. In 1945, the French Army found itself equipped with U.S. tanks. The Indochina War was fought with U.S. *M-24's* and a variety of U.S. armored cars. French armor employment in Vietnam was characterized by piecemealing — much like French tank employment in 1940. Whether this reflected stagnation of operational concepts, or the influence of prevailing myths about armor employment in the jungle, is not clear. As medium tank development with the Germans and Italians aborted, the French struck out on their own. The outcome was *AMX-30*, with good horsepower (h.p./ton = 21.2), torsion-bar suspension, dead-link track, low silhouette (7' 6"), and a 105-mm gun. The gun fires a low velocity *HEAT* round optimized in spin and velocity for armor penetration. Here the French made a conscious decision to optimize for *HEAT* at the expense of any hypervelocity kinetic energy capability, believing requirements of hypervelocity *KE* and slower moving *HEAT* to be so incompatible as to be nearly irreconcilable.

AMX-30



Crew: 4
Armament: 105-mm gun, 2 mg Engine: 12-cylinder diesel,
710 h.p. Weight: 39.6 tons

In addition, the French, long believers in the value of mobile, agile cavalry, sought to improve both mobility and gunpower of their cavalry vehicles. Believing that Europe's extensive road net — primary and secondary — offered great mobility advantages for wheeled vehicles, the French have fielded a reconnaissance vehicle fleet that features large caliber guns on wheeled armored chassis.

AMX-30, as the French view it, is a balanced design affording good survivability. However, while

AMX-13



Crew: 3
Armament: 75- or
90-mm gun, 2 mg

Engine: 8-cylinder gasoline,
270 h.p. Weight: 14.5 tons

PANHARD



Crew: 4
Armament: 75- or
90-mm gun, 3 mg

Engine: 12-cylinder gasoline,
200 h.p. Weight: 15 tons

its agility and mobility compare favorably with *M-60*, *Leo I* and others, it is not significantly more agile than those vehicles. In addition, the low velocity gun makes fire control difficult at longer ranges. Its armor, while well formed, probably does not afford survivability as good as that of *M-60*.

Sweden. One other European development is worth noting. The Swedish *S-Tank*.

The Swedish operational concept is rather clear — defense. The dominant design characteristic is also certain — survivability. Low silhouette, sharp armor obliquity, agility from a 240 h.p. piston en-

S-TANK



Crew: 3
Armament: 105-mm gun,
3 mg

Engine: 6-cylinder diesel, 240 h.p.
gas turbine, 300 h.p.
Weight: 43 tons

gine backed up by the 300 h.p. turbine for sprint, all spell heavy reliance on survivability. A sophisticated design, it is, for crew training, a fairly simple machine — reliable, maintainable, trainable.

Japan. Across the world, the Japan Ground Self-Defense Force was initially equipped with U.S. *M-4*'s and *M-24*'s. These were of a size difficult for Japan's terrain, roads, railroads and crewmen, all factors which caused the Japanese to commence autonomous tank development.

TYPE 61



Crew: 4
Armament: 90-mm gun, 2 mg

Engine: V-12 diesel, 600 h.p.
Weight: 32 tons

STB-1



Crew: 4
Armament: 105-mm gun, 2 mg

Engine: V-10 diesel, 750 h.p.
Weight: 41.9 tons

Type 61, with many components drawn from U.S. tank designs, featured an air-cooled Japanese designed diesel power plant, and good agility, afforded by an efficient mechanical transmission and hydraulic steering.

STB-1 with a 750 h.p. engine at 18 h.p./ton, hydropneumatic suspension, laser rangefinder and 105-mm British gun, is an excellent and advanced design. Mobility dominates gun-fire control and armor which seem to have about equal weight.

Israel. In Israel, a limited production base dictated heavy reliance on foreign-made equipment. In

M-4/105



Crew: 4
Armament: 105-mm gun, 3 mg

Engine: Gasoline, 500 h.p.

M-48A5/105



Crew: 4
Armament: 105-mm gun, 2 mg

Engine: V-12 diesel, 750 h.p.
Weight: 52 tons

CENTURION/105



Crew: 4
Armament: 105-mm gun, 3 mg

Engine: V-12 gasoline, 650 h.p.

In these tanks, the IDF mounted the excellent British 105-mm gun and M-60-series diesel power plant wherever possible to enhance standardization.

United States. The 1945 United States Army's 16 armored divisions quickly reduced to one, and newer model tanks — M-24 light and M-26 heavy — were distributed to the armored division and to newly formed reconnaissance companies, regimental tank companies, and divisional tank battalions in infantry divisions. While combined arms had become an accepted concept, the American Army apparently concluded that tanks, especially heavy tanks, were primarily for support of infantry.

As in the Soviet Army, the light-medium-heavy tank family idea persisted, and through the early 1960's, this family was fielded:

T-55/105



Crew: 4
Armament: 105-mm gun, 3 mg

Engine: V-12 diesel, 580 h.p.
Weight: 40.1 tons

M-24



Crew: 5
Armament: 75-mm gun, 3 mg

Engine: 2 x V-8 gasoline,
110 h.p. Weight: 20 tons

M-60A1/105



Crew: 4
Armament: 105-mm gun, 2 mg

Engine: V-12 diesel, 750 h.p.
Weight: 53 tons

the October War, the IDF fielded several up-gunned and up-powered versions of existing tanks. Starting with the U.S. M-4 and proceeding through M-48.

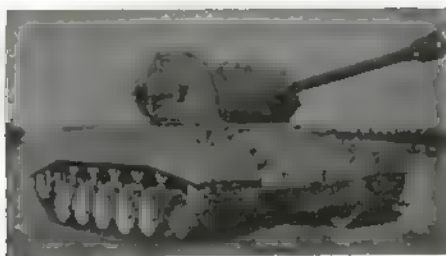
M-41/76 LIGHT



Crew: 4
Armament: 76-mm gun, 2 mg

Engine: 6-cylinder gasoline,
500 h.p. Weight: 25.5 tons

M-26/90 MEDIUM



Crew: 5
Armament: 90-mm gun, 3 mg

Engine: V-8, 500 h.p.
Weight: 46 tons

M-60/105, M-60A1/105 MBT



Crew: 4
Armament: 105-mm gun, 2 mg

Engine: V-12 diesel, 750 h.p.
Weight: 53 tons

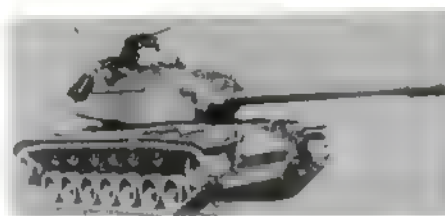
M-46/90 MEDIUM



Crew: 5
Armament: 90-mm gun, 3 mg

Engine: V-12 gasoline, 810 h.p.
Weight: 48.5 tons

M-103/120 HEAVY



Crew: 4
Armament: 120-mm, 2 mg

Engine: V-12 gasoline (later diesel), 810 h.p.
Weight: 60.5 tons

M-47/90 MEDIUM



Crew: 5
Armament: 90-mm gun, 3 mg

Engine: V-12, 810 h.p.
Weight: 48 tons

M-48/90 (A1, A2, A3) MEDIUM



Crew: 4
Armament: 90-mm gun, 3 mg

Engine: V-12 gasoline, 825 h.p. or 750 h.p. diesel
Weight: 49.5 tons

The U.S. Army gave up the three-tank family about the same time as the Soviets. What happened was that the gun-armor game quickly made light tanks heavier than World War II mediums. And mediums got so heavy, they were almost in a class with World War II heavies. While better guns and better armor made all this happen, there was a lag in automotive power development.

For years, American tanks were powered by gasoline engines — the thing American industry made best. Conversion to diesel came only after a long struggle, and was made more complicated by user insistence on air-cooled engines. Plumbing in World War II tanks, and most especially the world's leading plumbing nightmare, the *M-26*, convinced a generation of tank soldiers that air cooling had to be. The greater cooling volume needed by air-cooled engines is one reason U.S. tanks tend to be larger than other modern tanks, most of which feature liquid cooled power plants. In addition, American insistence on an automatic transmission makes for less efficient use of engine output power.

As noted before, the U.S. continued as a non-contender in tank gun design. The U.S. 76-mm, 90-mm, and 120-mm tank guns were adaptations of guns built for other purposes — one a Naval rifle, the larger two, antiaircraft guns. The 105-mm gun now standard in the *M-60*-series is the British design.

And so in 1975, the United States sports the unique distinction of being the only major tank designer in the world never to produce a tank gun of its own design.

Fire control included rangefinders beginning with *M-47*, rangefinder and partial solution computer with *M-48*, and a coupled rangefinder and gun-lay computer in *M-60*. While British tanks have been stabilized since *Centurion*, and Soviet tanks since *T-55*, post-World War II U.S. tanks have only recently had stabilization in *M-60A1*.

For armor, U.S. tanks have used both rolled homogeneous armorplate (RHA) and one-piece castings. *M-26* had a cast turret and a hull of RHA. *M-48* featured cast hull and turret. *M-60* reverted to RHA hull and cast turret.

Suspension systems for U.S. tanks beginning with *M-26* have featured independently-sprung, torsion-bar-supported, small-diameter road wheels and live track, giving generally better road speeds and longer life than other suspension concepts.

In the 1960's, the U.S. and Germany joined in a main battle tank program to develop the *MBT-70* which was to be the world's most technically advanced tank. The program foundered over an inability to agree on armament. The Germans, confident of their ability to make tank guns, stuck to their guns. The Americans, frustrated by an historic ineptitude in tank-gun design, developed a missile launcher which could also fire conventional ammunition. Guided missiles, with better hit probabilities predicted at longer ranges, seemed to be an attractive substitute for a better long-range gun. Fielding of the *Shillelagh* missile launcher on the *M-551 Sheridan* vehicle bolstered the confidence and visibility of missile enthusiasts, who preferred to ignore the considerable training and maintenance problems in missile firing turrets, decreased on-board ammunition loads with missiles, and the considerable, increased operational costs of training with missiles, whose per round cost is at least 20 times that of a tank gun round.

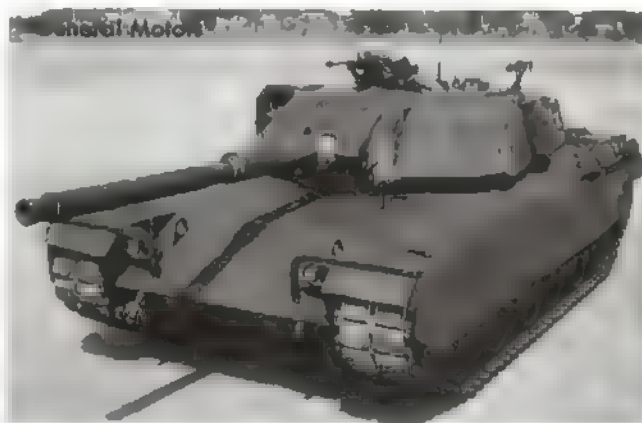
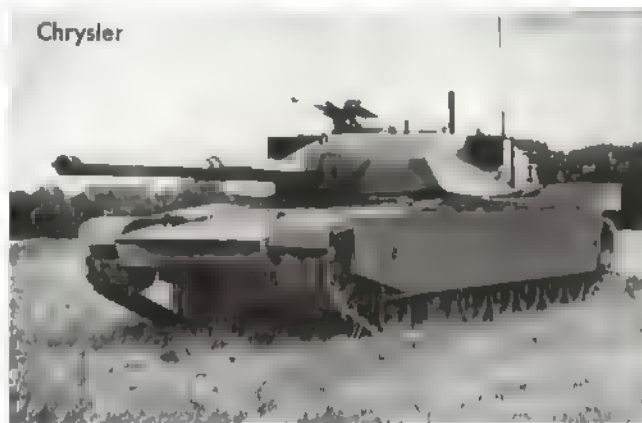
With the *MBT-70* program aborted, both partners began work to salvage something from the program and to field a tank featuring the best from the joint endeavor. In the U.S., this became the *XM-803* program, killed by Congress in 1972 because of its exploding costs. In Germany, *Leo II* incorporates many good features — the German version of *MBT-70*.

When *XM-803* died, the U.S. Army, over the protests of most of its armor community, affixed turrets

designed and built for *XM-803* to an *M-60* hull. This became the *M-60A2* missile firing tank, over 500 of which are being fielded.

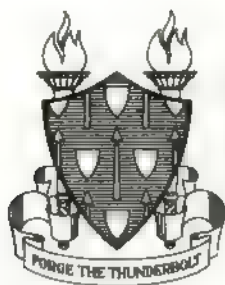
In addition, the U.S. began a design to cost development program for a cheaper tank than *XM-803*, with gun instead of missile armament, a new special armor, improved mobility, and full-solution fire control. Two prototypes of the *XM-1* are under development.

XM-1 PROTOTYPES



D. Mastany

EDITOR'S NOTE: When the tank design series started in the September-October issue of *ARMOR*, we promised a three-part series. Like many literary endeavors, this one has exceeded first estimates. Therefore, a fourth and final part summarizing design characteristics will appear in the March-April issue of *ARMOR*.



FORGING THE THUNDERBOLT

Gunnery Tips

A previous *Forging The Thunderbolt* article presented tips on several problem areas in *M-60A1* tank gunnery. This article will discuss the almost forgotten art of range determination.

With the advent of tank-mounted rangefinders (coincidence and laser), tank crews have depended on this equipment almost exclusively to determine range. However, when the rangefinder is not operational, the crew must accurately estimate range to insure a high probability of first round hits. Additionally, the TC must be able, at all times, to determine whether the target is within battlesight range for a battlesight engagement or beyond that range for a precision engagement. Range determination can be broken into two methods; *immediate methods* to be used with battlesight gunnery, and, when time permits, use of the most accurate *deliberate methods*.

Immediate Range Determination Methods

Recognition Method. Range determination by recognition is simple and amazingly accurate. This method is based on target visibility. It involves use of the naked eye or sighting through a magnifying instrument. With the naked eye, or sighting through instruments with 7-8 power magnification, the following targets are recognizable out to the ranges indicated.

Target	Range (in meters)	
	Naked Eye	Magnification 7-8 Power
Troops, Machinegun, Mortar, Antitank Gun, Antitank Missile Launchers	500	2,000
Tank, Armored Personnel Carrier, Truck, by model	1,000	4,000
Tank, Howitzer, APC, Truck	1,500	5,000
Armored Vehicle, Wheel Vehicle	2,000	6,000

It must be remembered, however, that certain light and terrain considerations may make the target appear larger or clearer than it actually is. The

target will seem closer if it is at a higher elevation; is seen in bright light; contrasts with the background; is seen across an open area such as a ravine, or river; or if it is significantly larger than the other features around it. The target will seem further away if it is at a lower elevation; camouflaged; is small in comparison to other features; is between the observer and the sun; is a dark color; or if visibility is poor.

Coax Method. Because of the similarities of superelevation angles for the 7.62-mm, 105-mm *HEP*, and 152-mm *HEAT-MP*, the coax can be effectively employed as a ranging gun to 900 meters (tracer burnout).

SIMILARITIES IN SUPERELEVATION ANGLES

	RANGE (m)				
	200	400	600	800	900
7.62-mm	1.6	3.7	6.5	10.5	13.3
105-mm HEP	1.9	4.1	6.4	8.9	10.3
152-mm HEAT-MP	2.2	4.6	7.1	9.8	11.2

In other words, if the coax is hitting the target, using the coax sight picture and firing *HEP* or *HEAT-MP* you should hit or be very close to the target. Using the computer to change superelevation, data will also enable the gunner to fire *HEAT* or *APDS* on the *M-60A1*.

Cupola-mounted Machinegun Method. On tanks so equipped, the .50 caliber machinegun can be used as a ranging gun to 1,600 meters. The tank commander using the *M-36* ballistic reticle fires the .50 caliber machinegun observing the range on the reticle used to hit the target. The tank commander then announces this range.

Deliberate Range Determination Methods

Mil Relation. The mil relation formula is an accurate method of range determination, providing the observer knows the actual size of the target, can accurately determine the mil angle of the target, and use the formula $\frac{W}{R} = \frac{M}{1000}$: that is; width (W) or size of actual target in meters divided by the appar-

ent mil angle (μ) of the target (using binoculars as mil relation in a sight reticle) equals range (R) to the target in thousands of meters. In the absence of knowing the actual size of the target it should be remembered that threat tanks are approximately 3.5 meters wide, 2.5 meters high, and 6.5 meters long. For example: the crew must engage an advancing threat tank which is 3.5 meters wide. Through a sight, the tank appears to be 2 mils wide; 3.5 meters (W) divided by 2 mils (μ) equals 1.75 thousand meters or 1,750 meters range (R) to target. A simple chart can be made up and kept by each crew member, or placed in a convenient portion of the tank. This chart would simplify the mathematics. An example chart is:

Mil Angle Measurement			1	2	3	4	5	6	7	8	9	10
R A N G E	Threat Medium Tank	Length 6.5m	6500	3300	2200	1600	1300	1100	900	800	700	700
		Width 3.5m	3500	1800	1200	900	700	600	500	400	400	400
	Threat Heavy Tank	Length 7.5m	7500	3800	2500	1900	1500	1300	1100	980	800	800
		Width 3.5m	3500	1800	1200	900	700	600	500	400	400	400

- Notes. 1. Range figures on chart are rounded off to the nearest hundred.
Tank measurements are rounded off to nearest half-meter.
2. The above chart shows how to use the mil relation to:
- Measure mil angle of target with binocular or sight reticle.
 - Find length or width of target in the chart.
 - Find range to target by reading to the right to the range under the mil angle measured with a binocular.

Flash Bang. In this technique, range is determined by measuring the time between the flash and the gun report. Sound travels through the air at a fairly constant speed, about 330 meters per second. Comparatively, light travels in no time at all. Range can be determined if you can see *and* hear the action. For example, when you see the flash or smoke of a weapon, or the dust it raises, immediately start counting seconds. When you hear the weapon fire, stop, and multiply the number of seconds by the constant 330 meters. But remember, if the enemy is shooting at *you*, you may feel the impact of his round penetrating your tank before you hear the sound of the firing from his gun! (*Remember sound travels at 330 meters per second. A T-62 tank round travels at 1,500 meters per second.*)

Miscellaneous Equipment Readily Available. By knowing the mil value at arms length of various pieces of equipment and the actual size of targets, you can determine range rather quickly with a reasonable degree of accuracy. Some figures worthy of remembering are: the hole in a dogtag is 7 mils wide, width of a flaceted pencil — 10 mils, 7.62-mm

brass casing — 15 mils, a 13-grain flechette — 3.5 mils, an 11-grain flechette — 3 mils. For example, if you can see the entire length of a tank through the hole in your dogtag,

$$\frac{W}{\mu} = R \quad \frac{6.5}{7} = .93 \text{ or } 930 \text{ meters}$$

the tank is 930 meters or greater in range.

Range determination is most certainly important to the firing crew since range data is the key to first round hits. Crews should be well aware of the above methods and practice them frequently to insure greater proficiency and speed of determining range.

Added Capabilities of the M-60A2 Tank

The *M-60A2* is here to stay! If we are to realize its full potential we must have open minds and constantly look for new and better methods of employment of the *M-60A2*. As we study the *M-60A2* in detail, we recognize more and more capabilities of the vehicle. One of these added capabilities is the result of the elimination of searchlight data from the range card used with the *M-60A2*, making it possible to fire all types of ammunition and all weapons from the same range card. Heretofore, a separate range card was required for each type of ammunition.

Presently, the range card is made up for HEAT ammunition utilizing the primary sight, the *M-50* periscope; therefore, in order to include data for other types of ammunition, the following procedure should be used.

● **CANISTER.** The gunner using procedures outlined in TC 17-15 will obtain the data for HEAT

ammunition: Range, Deflection, Quadrant Elevation. When the target is 400 meters or less, he includes data for CANISTER ammunition which has a maximum effective range of 400 meters. To determine the data for CANISTER, determine the data for HEAT, then place the 1,200-meter aiming point of the **telescope** on the center of target, center the bubble of the elevation quadrant, and record the reading as follows:

Example: Range Card Data
RJ RG 400 QE + 6 CAN + 8
 DEFL 2985R
 CANISTER data is recorded as CAN plus or minus so many mils

Example: Tank Commander's Fire Command
 GUNNER
 CANNISTER
 TROOPS
 DEFLECTION TWO NINER
 EIGHT FIVE RIGHT
 QUADRANT PLUS EIGHT
 FIRE (or AT MY COMMAND — FIRE)

● **MISSILE.** The gunner obtains the data for HEAT utilizing the *M-50* periscope. When the target is beyond 800 meters, the gunner then includes the data for MISSILE. The missile is not fired on targets at ranges less than 800 meters and must always be fired with visible light. In order to obtain the data for MISSILE, the following procedures will be used. First obtain the data for HEAT, change the armament selector to MISSILE, use the **telescope** to lay the missile reticle on the center of the target, center the bubble on the elevation quadrant, and record this reading as follows:

Example: Range Card Data
RJ RG 1400 QE + 7 MIS + 2
 DEFL 850R

Example: Tank Commander's Fire Command
 GUNNER DIRECT FIRE
 MISSILE
 TANK
 DEFLECTION EIGHT FIVE ZERO
 RIGHT
 QUADRANT PLUS TWO FIVE
 FIRE (or AT MY COMMAND — FIRE)

● **.50 CAL.** There is no need to record data for the .50 caliber machinegun; however, the .50 caliber can be layed on target from range card data recorded for HEAT ammunition. All that is required is to follow the fire commands listed below.

GUNNER (The commander must alert the crew).
CALIBER FIFTY (The commander must tell the crew what weapon is to be fired).

TRUCK (The commander describes the target).
 The fire command is continued, using range card data.

DEFLECTION TWO NINER EIGHT FIVE RIGHT

The gunner traverses to the announced deflection and reads back. While the gunner traverses, the commander takes control of the computer and manually indexes the range. The commander announces **QUADRANT PLUS ONE SIX**. The gunner sets the reading on his quadrant and centers the bubble of the elevation quadrant with his gun controls and reads back. At this time, the commander moves his stabilization switch to the **READY** position, and the **GUN SELECT** switch to the **MAIN** or **COAX** position. Once the cupola gun has been aligned with the main gun, the commander must move the **GUN SELECT** switch to the **CUP** position. If he does not, the .50 caliber will not fire. The commander then places the stabilization switch in the **STANDBY** position. This is done to eliminate the drift which may occur in the system. Upon effective illumination or when he is ready, the commander announces **FIRE**. If the target is to be illuminated, the commander places the appropriate range line on target and fires. If the target is not going to be illuminated, the commander fires from range card data. The firing tables for 152-mm HEAT *M-409*,

152-mm Heat		.50 Cal API		
Range	Super-elevation	Super-elevation	Beaten Zone	
Meters	Mils	Mils	Width/Length Meters	
100	1.1	.7	0	732
200	2.2	1.5	0	676
300	3.3	2.3	1	624
400	4.5	3.2	1	574
500	5.7	4.1	1	528
600	7	5.2	1	484
700	8.3	6.3	2	443
800	9.7	7.6	2	405
900	11.1	9	2	370
1000	12.6	10.6	3	338
1100	14.1	12.3	3	309
1200	15.7	14.2	3	283
1300	17.4	16.4	4	260
1400	19.1	18.7	4	239
1500	20.9	21.4	4	223
1600	22.7	24.3	5	210

and .50 caliber API M-8 show that the superelevation for HEAT and the superelevation plus the beaten zone for API makes firing from range card data effective for suppressive fire.

At the completion of the engagement, the commander announces END OF MISSION — CEASE FIRE. When the crew is involved in multiple engagements, if the commander simply says CEASE FIRE to alert the crew that he has finished his .50 caliber engagement, the gunner also will cease his engagement with the weapon he is firing, i.e., main gun or COAX. Therefore, the commander must use END OF MISSION to alert the crew that he has finished the .50 caliber engagement. The reason for CEASE FIRE is to let the gunner know that he can relay on his reference point and announce READY when he has relayed. If the commander does not announce CEASE FIRE, a requirement may exist for a new engagement from the same data.

• **COAX.** The COAX may also be fired from the same data as for the HEAT round if the target is between 0 and 900 meters. Normally the 800-meter range line of the telescope is used for greater accuracy; however, the data for HEAT and the 800-meter range line of the telescope may also be used. The tank commander issues a fire command. At this time crew duties are performed.

GUNNER

COAX

TROOPS

DEFLECTION ONE EIGHT NINER ZERO RIGHT

The gunner traverses and reads back the deflection. While the gunner traverses, the commander takes control of the computer and manually indexes the range. The commander then announces QUADRANT PLUS TWO. The gunner sets the reading on the quadrant, centers the bubble with his manual gun controls, and reads back the elevation. At this time, the commander may announce — AT MY COMMAND. When the commander is ready for the gunner to fire, he announces — FIRE — and the gunner announces ON THE WAY (one time only). If the target is illuminated, the gunner places the 800-meter range line of the telescope on target and fires and adjusts until the command CEASE FIRE. When using range card data, the COAX is effective for suppressive fire as shown by the firing tables for 152-mm HEAT M-409 and 7.62-mm BALL M-80.

152-mm Heat Range	Super- elevation	7.62-mm Ball Beaten Zone			
		Super- elevation		Width/Length	
Meters	Mils	Mils	Mils	Meters	Meters
100	1.1	.8		Not computed	
200	2.2	1.6		Not computed	
300	3.3	2.6		Not computed	
400	4.5	3.7		Not computed	
500	5.7	5	3	1	39
600	7	6.6		Not computed	
700	8.3	8.5		Not computed	
800	9.7	10.8		Not computed	
900	11.1	13.5		Not computed	
1000	12.6	16.7	3	3	48

The information in this article is being transmitted to the units in the field who are receiving or presently have the M-60A2. It will also be added to the new FM 17-12.

M60A1 Product Improvements

As a result of studies conducted by the Directorate of Combat Developments, *Product Improved M-60A1* tanks are rolling off assembly lines. The product improvement program has upgraded many features of the Army's main battle tank.

The most significant advancement involves reliability. Under severe testing conditions, the Reliability-Improved Selected-Equipment (RISE) engine has averaged over 5,000 miles before requiring replacement. This is due, in part, to the improved efficiency of the new Top Loading Armored Air Cleaners. Other changes include improved starters, fuel injection lines and nozzles, stronger cylinders, and better turbochargers. New production and overhauled tanks are also being modified to accept a 650-amp, oil-cooled alternator, a solid state regulator, and a new wiring harness to make quick disconnects more accessible.

Additional items currently undergoing final acceptance testing at Fort Knox include:

- New night vision devices good enough to allow "day" tactics at night.
- An improved personnel heater.
- More reliable air cleaner blower motors.
- Individual-round ready rack handles which facilitate the handling of the second round.
- An improved driver's escape hatch.

A decision concerning the addition of a laser rangefinder and solid state computer to the fire control system will follow an in-process review which was scheduled for November 1975. □

A LOOK DOWN THE PIKE

The past several issues of **ARMOR** have contained a great deal of material on tanks, the highlight of which was the publication of the first photographs of the **XM-1** prototypes in the November-December issue. I was very pleased that the photos and information were released early to **ARMOR** by the **XM-1** Project Manager. We will continue to keep our readers updated on the progress of this important new tank program.

I am aware that there are some fine minds that have more to say on tank design and development, and they shall be published. To exchange ideas is a primary purpose of our journal.

I do think we should look at the **XM-1** as a concept that required careful study and prefabrication by a lot of knowledgeable people and the end result is going to be the "fightin'est tank" the U.S. has ever conceived. This is not to say that tank design will now stagnate for 30 years. We must consider that the **XM-1** in early 1972 was a blank piece of paper perched on tons of reference material which was screened by hundreds of experienced military and civilian experts in their field.

In late 1971, about the time the **XM-803** went down the tube, or maybe a little earlier, there was a document being circulated within the Armor Community which basically said, among other things, that in tank development, the U.S. was ready to trade "protection" for "mobility and agility." This thinking was included in the initial guidance to the Main Battle Tank Task Force when it was formed in February 1972.

Then came the impact of a worldwide study of the **KE** projectile and **HEAT** missile threat. BAM! It was apparent that the British, Germans, and Russians were looking at such a threat also. The word "survivability" began to dominate the theme of reports. Several studies in Europe and the U.S. indicated that speed and agility alone were not sufficient to produce the significant decrease in vulnerability that is required to meet the criterion for survivability; **an MBT must protect its crew by taking multiple hits from an array of weapons.**

As things moved on, another suspicion was confirmed. A tank does not have to be small to be fast and it does not have to be light to be agile. The state of the art has

progressed to the point where power and weight can be married to a suspension system so that there is only a negligible difference between the responsiveness of a 30-ton tank and a 50 tonner.

When you can get speed and agility without giving up superior protection for the crew, this would seem to be the way to go.

However, high costs rears its ugly head in most everything these days and especially in weapons development. It has been proposed that a buy of two or three "tough little tanks" might offset the combat power and expense of the **XM-1**.

Not any tank comes cheap anywhere on the world market today; and in the U.S., because of labor, material, and research and development cost, a smaller, lighter tank most probably would cost at least half as much as an **XM-1**. At half the cost, what then would be the degradation in protection and combat power — a big question and a bigger gamble.

I, for one, personally feel there should be a good light tank in the inventory someday. From its conception, it should not be a stand-in for an MBT, but a well-armed and armored vehicle configured to meet the requirements of armored cavalry units as part of strategic airlift forces. There may never be enough **XM-1**'s to go around, and there will be some contingencies where its combat power is not needed. A review for the requirement for a hard-hitting light tank might be in order. The **T-92** may have been a step in the right direction, more so than the thin-skinned **M-551**.

There are those, of course, who feel that numerous **TOW**'s mounted on a variety of vehicles could offset the cost and combat power of MBT's. These antitank advocates argue that as many as 50 **XR-311**'s mounted with **TOW**'s can be fielded for one **XM-1**. Be that as it may, we should be very careful about such a tradeoff because thin-skinned vehicles similar to the **XR-311** are vulnerable to the massed artillery fire employed by threat forces. For example: During the **Huntfeld II** study for defensive doctrine, 60 lightly-armored vehicles — **M-113**'s and **M-551**'s — were destroyed during the enemy's preparatory fires. So, it would be a hell of a note to find out, during the first hour of the first battle, that such a tradeoff was a mistake.

Therefore, agencies will continue to study speed, agility, and responsiveness versus vulnerability as it relates to a combat vehicle's survivability. Much research and analysis will continue as it should in the conduct of armor warfare.

We are all aware we need more and better ships for the Navy and the best aircraft in the world for our services. One thing for sure, with the **XM-1**, our Army has come a long way down the pike in tank development.

As the mounted combat arm, the U.S. Cavalry, now Armor, moves into its third century, we can look proudly at its past and with great confidence and enthusiasm to its future.

I am always pleased to publish thought-provoking and controversial articles. Keep them coming.

A Horse Cavalry officer at the end of WW I remarked, "These things (tanks) will be a boom to toymakers. That's about the limit of their worth; not warfare."

As you see, everybody has an opinion.

— Editor

"ANTITANK" is a big word this year.

Since its billing as a virtual panacea in the face of our perennial problem of numerical inferiority against the forces of the Warsaw Pact, and buoyed by the evident success of antitank weapons in the Middle East War of 1973, proponents of increased antitank forces have been in the ascendancy. The availability of modern antiarmor missile systems of proven effectiveness; the lure of lighter, less expensive, and hence, more numerous weapons systems; and the natural enthusiasm for any promising new approach to an old, daunting problem, have combined to push antitank weapons into the spotlight.

But, as with any promising capability, there is the danger of some proportionately costly mistakes. In tackling any dramatic shift in emphasis, we should consider three pretty obvious rules of thumb which often seem to be overlooked:

- Antiarmor must be a complete, complementary program; not just new hardware, but doctrine, organization, and training developed and proven as carefully as possible before technical development has progressed so far that it acquires a momentum all its own.

- These innovations in hardware, doctrine, organization, and training must be integrated realistically with an overall plan for achieving victory in the field — not as an emergency stopgap measure to solve one isolated problem at the cost of the capability to solve others.

- It should be realized that rapid expansion of any one area will necessarily have an effect on other related areas, and will have to dovetail with the complete spectrum of capabilities.

While this article — like antiarmor systems — is not meant to provide an answer to all these questions, it seems worthwhile to look at some possible ways of integrating this developing antiarmor force in our total structure.

What do we want the antiarmor elements to do?

I suggest some counterintuitive answers:

- Antiarmor systems should *not* normally be expended killing tanks.

- Separate antiarmor units have a role with the mechanized infantry in the defense, and with armored elements in the attack.

- Antiarmor units are not viable substitutes for tank units in any situation; when this substitution is made, such elements display the *worst* features of tank units, and surrender their own innate strengths.

So far, this may be pretty hard to accept. But



NEEDED NOW: AN ANTIARMOR DOCTRINE

by Captain Timothy R. O'Neill

look at the results of the 1973 war which are most often cited as support for antiarmor systems.

The Israeli's initial heavy losses seem to point to a vulnerability of tanks to large numbers of infantry antitank weapons. Yet, on reflection, the problem is admitted to be one of doctrine: the attacking tanks were without close infantry support. If this is the reason for the losses, then the vulnerability of the tank is a situational phenomenon based upon misuse of the combined-arms team.

At best, then, a defending force might seek to *recreate these conditions*.

What might an attacking force look like?

For purposes of discussion, let us use the reasonable example of a tank-heavy Warsaw Pact force consisting of *T-62/T-70* main battle tanks as the bulk of the formation, supported by infantry units mounted on *BMP-76PB* infantry combat vehicles,

and escorted by mobile antiaircraft weapons on the order of ZSU-23(4) for close-in protection against Tacair and helicopter gunships. It also seems reasonable to assume that this force will attack mounted (infantry in carriers), under heavy high explosive (HE) and chemical, biological, and radiological (CBR) preparation and cover, and with heavy numerical superiority.

Assume that the defending force is heavy in antiarmor systems: *TOW* in protected carriers and at battalion and separate formation level, and *Dragon* at company level. Assume further that the antiarmor units have been trained to concentrate on enemy tanks as a principal target.

The missiles perform effectively; approximately 60 percent of the attacking force's tanks are disabled. But the enemy is attacking in large numbers, and the remainder of the force has penetrated the forward areas, and must be engaged by the counter-attacking reserve. The enemy force consists of a fairly large (but not entirely overwhelming) number of tanks, and most of the original complement of armored infantry.

A few years ago, I might have said *motorized* infantry. But the *BMP* makes this force something quite different — it is now *armored infantry*, by virtue of providing a tracked armored carrier with significant antitank capability in the gun and missile combination. It is now not only an infantry carrier, but also a strong, offensive, antiarmor weapon. The effect of reducing tank elements is not so dramatic as it might have been once.

Instant replay: The antiarmor elements in the defense have been given a rare chance to try again. The gunners have been given a new priority of targets:

- Infantry fighting vehicles
- Antiaircraft vehicles
- Tanks

Once again, the missiles find their targets. The smaller number of infantry fighting vehicles are soon depleted; surviving infantry must walk or ride the tanks through defending fire and their own and defending CBR residue. If penetration is, in fact, achieved, the surviving force is no longer a balanced combined-arms team, but a very unbalanced tank force separated from its supporting infantry and antiair protection.

Lesson: The first force finished the opening phase of the attack as a combined-arms team — a team with fewer tanks, but with its full complement of infantry fighting vehicles with their own significant

ability to function as "tanks." The second force is a tank formation without effective support.

Which force would you prefer to engage?

Doctrine: The Defense

How can this encouraging picture be integrated into a coherent defense?

Any mobile defense on the modern battlefield must, in the final analysis, provide for four fundamental considerations.

- *Any decision to yield the initiative to the enemy, even in the defense, must be made with the greatest caution.* Initiative is seductively easy to discard "temporarily," an elusive prize to recapture.

- *Any decision to allow the enemy attacking force to bypass or isolate friendly defending forces, without an extremely high expectancy of eventually repulsing or containing him is a most desperate endeavor.* Thus, blocking forces that are bypassed tend to become what the German's referred to as "fortified localities," rather than "bypassed, cutoff, or surrounded forces."

- *The most effective way to avoid losing the initiative is to disrupt the enemy's formations and combined-arms integrity as soon as possible and as far from rear areas as possible.* Attacks that do not go according to plan have a tendency to lose initiative and momentum rather quickly, unless the attacker has a rare combination of disciplined, seasoned, and panic-proof troops, fast and sure communications, and leadership with uncommon flexibility and talent for improvisation. If they have all these things and we don't, they are a rare army, indeed; in that case, the answer is not a spirited defense so much as a negotiated settlement.

- *The surest way to avoid sacrificing forward defensive elements is obviously to prevent penetration; failing that, to deny the enemy the ability to exploit or consolidate once he has penetrated.*

Antiarmor forces can be used in such a way as to satisfy all these requirements, *as long as they are employed as an integral part of a complementary system of combined-arms defense.*

Active Defense

Remembering the implications of the combined-arms team disruption illustrated in our earlier scenario, we might envision a defensive tactic, or series of tactics, aimed at recreating the separation of tanks from supporting elements. The scheme suggested here is not original. It combines the better features of mobile and force-oriented defense

while minimizing their most evident weaknesses.

The fundamental objective of the *active defense* (figure 1) is to regain the initiative from the attacker as soon as possible. This is accomplished, in general, by forcing him to deploy under fire as soon as possible and under the least favorable conditions, slowing his movement and forcing him to improvise on, or even before, crossing the line of departure or line of contact (LD/LC), separating tanks from their most vital support — armored infantry and air-defense elements — and isolating and reducing the remaining tank forces.

The foregoing is accomplished by engaging the enemy in three successive zones: a *disruption zone*, *attrition zone*, and *counterattack zone*.

The *disruption zone*, which is generally observed rather than manned, extends from the traditional FEBA into the enemy's forward areas, including routes to his assembly areas and the assembly areas and attack positions themselves. Improved battlefield instrumentation, sensing devices, aerial observation, even reconnaissance satellites, can provide early warning of enemy movements that signal his intention to attack. The disruption zone is, for the most part, under a heavy enemy air-defense umbrella, and hence, it is not a very suitable area for employment of Tacair or gunships; hence, tube artillery will play the dominant role in engaging the

enemy forces in this zone, striking attack positions and forward routes, providing counterbattery fire, slowing and harrasing the enemy with HE fire, artillery-delivered hasty minefields, and smoke. The attacker must be made to remain mounted and buttoned up, and he must be shaken up before he ever comes into serious contact with defending ground forces.

The *attrition zone* depends heavily on ground antiarmor systems supported by protected infantry. This system of "dispersed strongpoints" (DSP) has been alluded to in "Tank Destroyer for the 70's" (*ARMOR*, May-June 1973). A DSP is, in essence, a system of interlocking mounted, armor-protected long-range (3,000+ meters) antiarmor weapons, which cover a certain critical point without necessarily physically occupying it (figure 2). Furthermore, the long effective range of the weapons and mobility of the carrying vehicles make a DSP extremely difficult to reduce. (The principal weapon envisaged in the 1973 article as a basis for a DSP was the *TOW/TD*: an armor-upgraded *M-113* carrier with *TOW* launchers mounted under an armored umbrella, which was to be capable of being raised, tilted, and traversed.)

The defending forces in the attrition zone are deployed in an interlocking, mutually supporting matrix of DSP's. These strongpoints are not fixed.

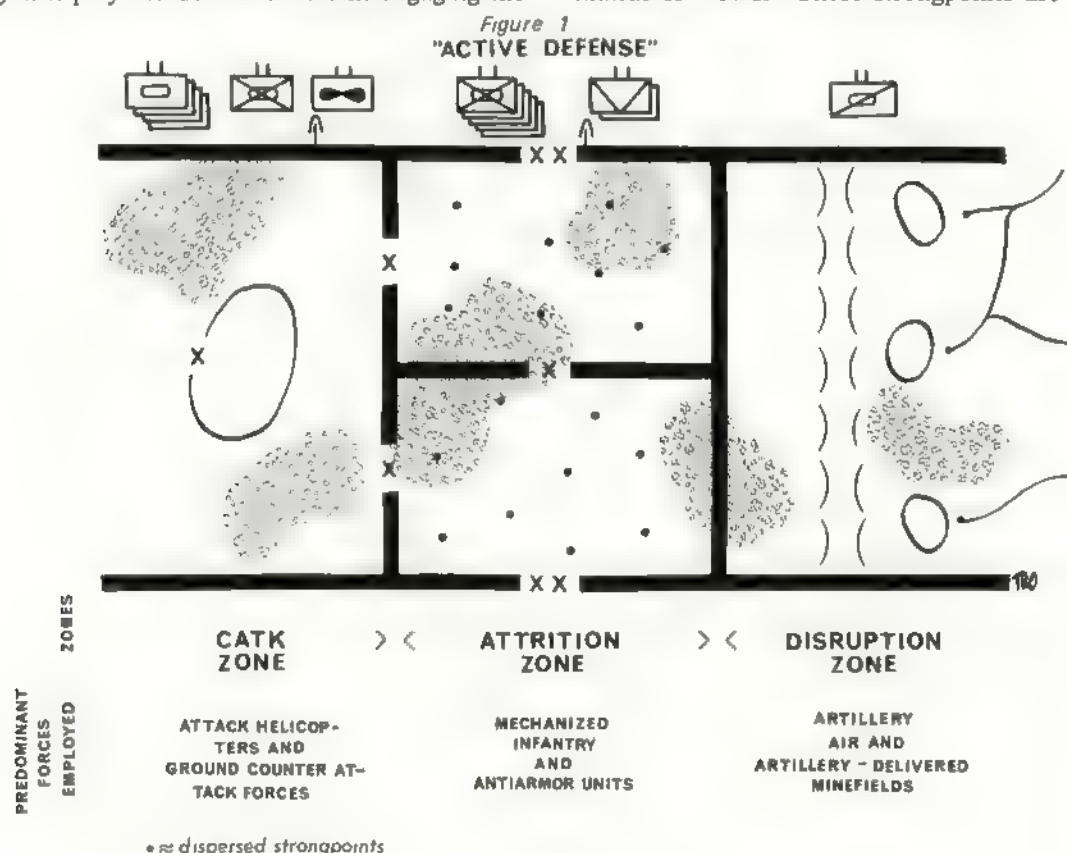
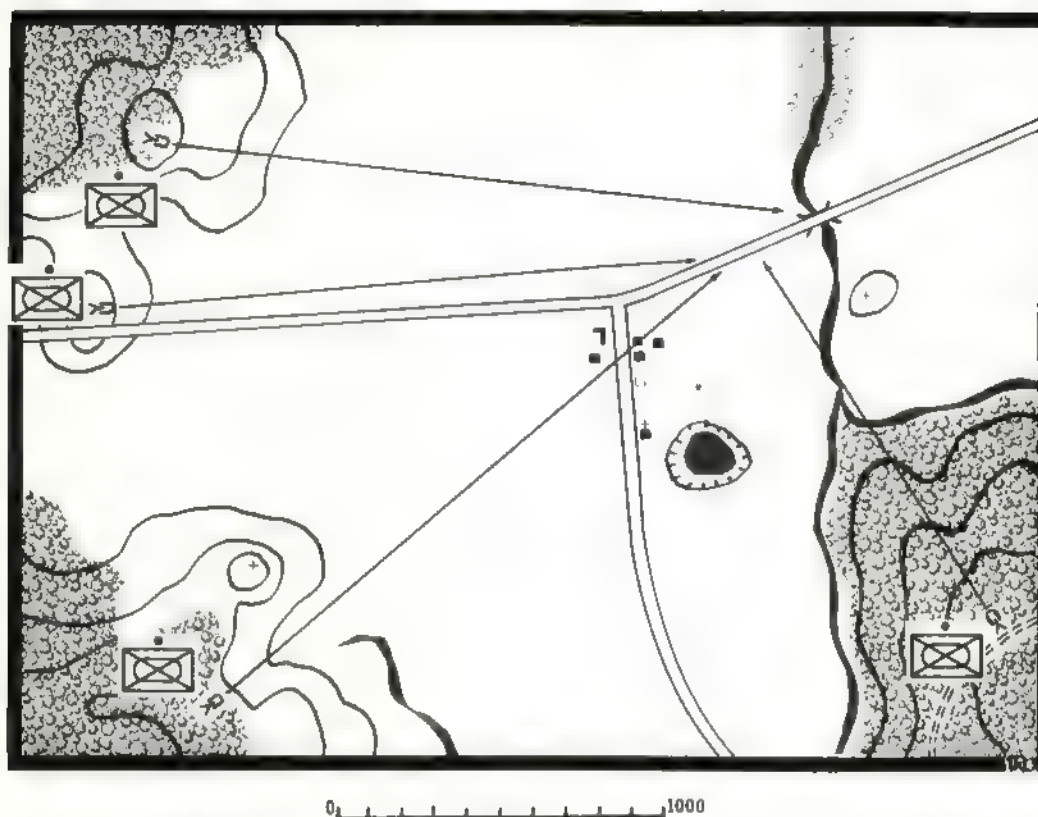


Figure 2
"DISPERSED STRONGPOINT"



A characteristic of missile-armed units is their tendency to expend basic loads quite rapidly. Hence, the elements of a DSP have to be able to pick up and move, if possible. If an element can get far enough to the rear to reload, it can be used again, but the emphasis is on doing its job, not delaying.

Its job is, of course, to peel away the attacker's infantry support; knock out as much as possible of his air-defense capability (at present most awesomely represented by the ZSU-23(4)); and, when and if none of those targets present themselves, destroy tanks.

The *counterattack zone* is nearly the same as the *killing zone* of the mobile defense. When the enemy force has seen the last of the *attrition zone*, and presuming the DSP's have done their job there, the attacker will carry two key deficiencies: combined-arms imbalance, which makes it significantly weaker; and reduced air-defense capability, which makes it prey for attack helicopters. When the enemy has been sufficiently weakened by our defensive tactics, the ground counterattack force may be committed.

If the first two zones have taken their toll, the counterattacking force should be facing an enemy who has lost the initiative, been shaken by losses and continual effective enemy fire, and rendered largely

incapable of protecting itself against air attack or effectively consolidating against ground attack.

Doctrine: The Offense

Advocates of the enlarged antitank force find the question of offensive doctrine a perennial *bête noir* — if the enemies of the "special purpose weapons system" have a natural and vulnerable target, it is the antitank system which either flounders awkwardly or lies idle when it comes time to attack. The author took the trouble to compose some comments in the *Letters* column some months ago on this subject, and a major impetus for the present article was the rethinking that effort required. The problem has been addressed before in a variety of short treatises, but general consensus leans toward an overwatch role in conjunction with forward elements in the attack. While this is a promising approach, it is not entirely satisfactory; *overwatch* — and, particularly, the ability to employ it — depends a great deal upon the nature of the ground, the enemy, and the scheme of maneuver. Lurking in the shadows of overwatch is the danger that terrain considerations which favor it may run counter to the maneuver scheme which might otherwise be most favorable, and the commander might be tempted to choose the course

which allows overwatch in order to make use of the antiarmor capability or, conversely, choose the better axes and leave the antiarmor units idle. Neither sounds inviting.

Overwatch, then, while obviously a *major role* for antiarmor elements in the offense, is no complete answer. Other possible roles might include:

- Economy of force missions, flank guard, security, and protection.
- Reinforcement of combat elements with peripheral missions: e.g., divisional armored cavalry squadron.
- Reinforcement of exploiting elements to increase their ability to consolidate.

The suggestions above do not represent a complete list of offensive missions; nevertheless, it seems more than just an intuitive hope that there is sufficient need for the employment of antiarmor elements in the attack.

An interesting paradox arises from the overwatch and related roles. In the defense, the antiarmor resources are likely to be tied to infantry elements — whether the final solution resembles the mixed dispersed strongpoint/infantry attrition force of the *active defense* or is something quite different, the antitank (AT) missiles will probably be right there with the mechanized infantry — and, when the force turns to the attack, the antiarmor elements will shift to the attacking tank-heavy formations' control. This has some profound effects on organization — particularly if these weapons appear in anything like the numbers suggested by current thinking.

Organization for Combat

Antiarmor weapons in the sense discussed here fit into two separate organizational categories: those which are integral to the TOE of mechanized infantry companies and battalions (Airborne and air-mobile units are not considered because they would be employed in the active defense at great risk) and those more naturally found in separate units, probably at division level. It is conceivable, of course, that the infantry battalions could be extensively reconfigured to support a primary antiarmor role, absorbing in the process the weapons which would otherwise be set aside for separate antiarmor units; but this would have two crippling disadvantages. There would be no simple way to shift or concentrate the antiarmor resources across the division front, since such movements would normally be limited to a battalion front if the battalion owned them; and such battalions, if missile-heavy, would

not be very well organized for the attack role.

The *TOW* and *Dragon* have already been assigned to niches in the battalion and company; other than a mere numerical increase, the only organizational problem yet to be licked effectively is that of resupply in the face of the enemy. Neither 5-ton trucks nor even *Gama Goats* will be very efficient for this mission, and the *M-548*, a tracked cargo carrier used by the artillery, is too much a creature of the rear areas. The most likely candidate for this role is probably the *M-113*, stripped of interior fixtures and upgraded in protection and provided as augmentation to the battalion support platoon. The section leader responsible for resupplying antiarmor weapons will be a busy man: it won't take long for the attrition zone DSP's to shoot up most of their rounds. Faced with the problem of resupplying scattered sites with individual loads, it might be more feasible to set up ammunition resupply points toward the rear of the zone and farm out ammo carriers to the DSP's for use in the self-resupply; but this is a question best answered in field tests.

The organization of separate antiarmor units has been dealt with in some detail in the earlier article. However, my thinking has changed since that time in several important respects (though I still cling to the term "Tank Destroyer," if only because we can identify with "TD" and because it has somewhat more pizzazz than — what? "Armor Destroyer"?).

The major modification that I suggest was adopted because I have been bothered since the original publication about the difficulties in cross-attaching infantry from the line battalions with separate standard platoons from the TD battalion. For one thing, when all the companies and platoons are farmed out to DSP's, there remains in the rear a battalion headquarters with an ample HHC, with nothing to do but feed and maintain itself, and worry about its loaned units. This is poor use of a headquarters. Yet, there has to be one, as the idea of a cluster of autonomous companies or platoons directly under divisional control poses its own problems. In essence, the headquarters is needed when the battalion is out of the "line" and superfluous when the fighting starts. The effect of farming out the TD's is a sort of mutually beneficial merger of battalions.

However, the DSP's have the virtue of being rather uniform in structure and, if institutionalized, they will consist of a platoon headquarters led by a lieutenant, who will never suffer from boredom; four firing sections, each with a *TOW*-equipped armored personnel carrier and a squad of mechanized infan-

try to protect the launcher from being surprised or overrun by a dismounted attack; and a support section operating under the supervision of the platoon sergeant. This allows company and battalion to be deployed "straight" to stiffen the regular mechanized infantry positions. A problem here is the necessary intermingling of separate commands on the ground and the coordination problems created by that arrangement. This is probably best handled directly by brigade; in any case, it is probably worth the risk of a few squabbles over priority on routes and other such coordination tangles that come up when balanced with the obvious advantages of having DSP "packages."

(Another alternative is direct cross-attachment of TD and infantry battalions, with separate "front-ages" controlled by each; but this removes the division commander's flexibility in shifting the TD resources to the same extent as the option of direct issue of the resources to the infantry battalions. The DSP "package" platoon is *probably* the best answer.) (Good luck, MASSTER.)

(A second alternative suggested during a review was abandonment of the integrated DSP/mechanized battalion concept and use of what amounts to independent company-size swarms of TD's. This solves quite a few command and control problems. At the same time, however, there are two disadvantages. First, there is always the disruption [or potential disruption] of existing units already in the defensive scheme, unless the marauding TD units are positioned externally to those dispositions; presumably such attacks would be unleashed as a last resort. Second, the TD is a hard target when hidden and defiladed; when committed to a melee-type engage-

ment, the rapid fire and superior all-round protection of the attacking force and closer engagement ranges would favor the attacker.)

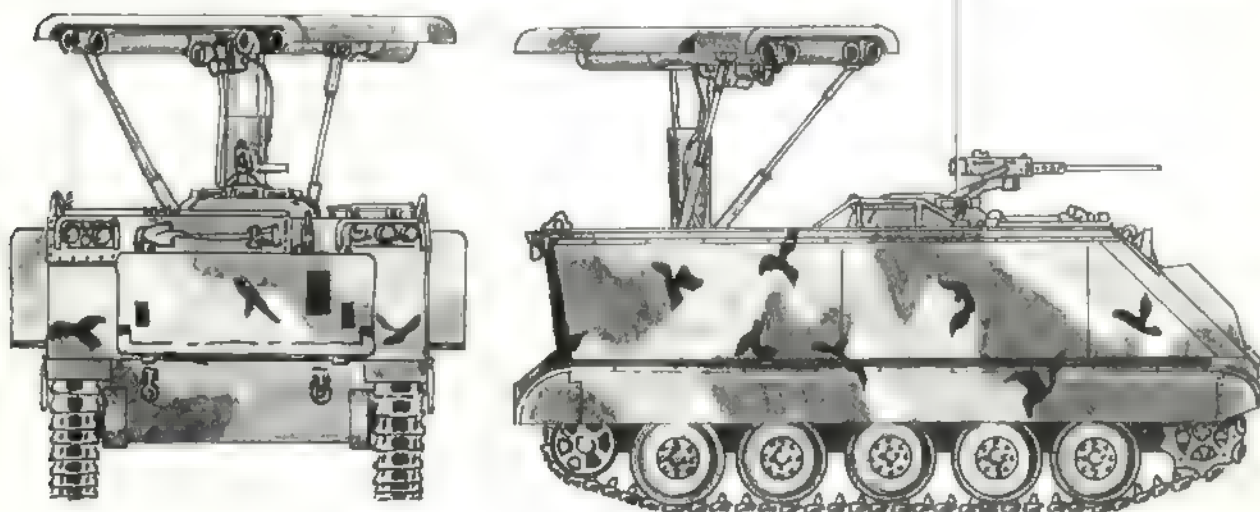
Hardware

Once again, "Tank Destroyer for the '70's" ploughed over the technical ground pretty thoroughly in 1973; but, as before, some new ideas have crept in.

The basic vehicle is still the *M-113A1* carrier equipped with the "barber chair" launching fixture which fits flush with the top of the hull when lowered and is raised, tilted, and swivelled by the gunner through a simple hydraulic system (figures 3 and 4). Two additional launching tubes have been added (Why not? They fit, and you can fire twice as many without having to reload), along with a somewhat different armor array. The umbrella "lid" is composed of a thickness of approximately 3 inches of lightweight armor of fiberglass weave material in a hard epoxy matrix encased in a thin aluminum cover. This material might also be used to line the inside of the fighting compartment to reduce the possibility of explosions due to penetration by heavier automatic weapons. Finally, since the additional armor would degrade the swimming capability, flotation pods have been added.

The *TOW* is retained; use of *Dragon* on such a system would probably be a waste of a good mount. Additionally, the maximum range of *Dragon* is less than the *T-62's* grazing range. Nevertheless, it seems reasonable to devise a mount for *Dragon* in its mechanized infantry role, but there seems little point in putting such a short-range weapon in a separate unit.

Illustrations by the author



Shortly after the publication of "Tank Destroyer for the 70's," a contractor called to my attention a related vehicle that had been tested earlier by MASSTER. The antiarmor weapon on this vehicle was essentially an erectable tower for TOW launchers mounted on an M-113 chassis. The tower was hinged and folded back and down when not in use. The idea was similar in some respects to the TOW/TD envisioned in the article about TD's for the 70's, but differed in two important ways from the latter: it was unarmored and hence, vulnerable to artillery and nuclear preparation, and it was exceedingly bulky. In addition, it had some impractical aspects: the space required for the hydraulic and mechanical assembly for raising the tower reduced the space available for the basic load of ammunition, the vehicle required some rather special terrain to be used effectively, it might well prove a challenge to camouflage, and reloading the launcher would naturally require either considerable time or extraordinary daring. In short, while the idea had some merit, it just wasn't tactically feasible.

There are some additional pros and cons from the technical/tactical point of view which deserve note before closing:

The antiarmor weapon system described herein has the important virtue of being small in weight and cube; a great deal of ready firepower is thus strategically deployable in a far shorter time than in the case of tanks. Compare, for a moment, the number of M-60A3's which can be carried in a C-5A with the number of M-113-based TOW/TD's that can be lifted in the same type of aircraft. Consider at the same time: what kind of weapon is most likely to be required for *immediate deployment*? In case of war, particularly in Europe, the initial requirement might well be for the greatest possible concentration of antiarmor firepower that is deployable in the least amount of time.

The components necessary for integration into a fielded system are largely available — the proven M-113 and the TOW. The integrating mechanism is essentially not much more complicated than its immediate ancestor, the barber chair, and is theoretically feasible without much risk (though, as any veteran of the Armor Board's travails will be quick to point out, theory is often found wandering aimlessly of its own accord several kilometers ahead of fact); and the armor array is relatively inexpensive, available, and workable.

On the other hand, the TOW's major frailty is transferred to the TD: the ammunition is expensive,

bulky, and quickly expended in a hot battle. This requires a very strong resupply capability (the support section of the DSP platoon, for example) and consequent personnel and equipment overhead.

The missile system is relatively inflexible in the face of countermeasures. No single countermeasure is totally effective — not smoke, or cover of night, or a host of tactical evasions — but *in toto* may reduce the overall lethality of the missile. This is not a fatal flaw, but does require the sober conclusion that the system is not able to operate *alone* on the battlefield, but must support and be supported by combined arms. This should not, one hopes, surprise the reader.

Finally, there are related problems accompanying the debut of such a major doctrine, including organization and technical shift which fall under the label, the reader should excuse the expression, "political considerations." These possible haggles involve such questions as: a competing fund squeeze (Someone — several names come to mind — will certainly suggest, since logic has not traditionally wielded much fiscal clout, that since the Army wants TOW/TD's, the need for the XM-1 is certainly questionable); and the propensity (What brass will the antiarmor crewman wear? Will he train at Benning? Knox?).

Conclusions

We have a capability, a strong capability, which is advanced from the technological point of view, but is still in its doctrinal and organizational infancy.

It is a promising capability; but it can be ruined, like anything else, by lack of imagination in integrating doctrine, organization, and training.

Antiarmor equipment and doctrine offer a vast promise; but alas, vast promises often fall prey to half-vast ideas.



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The T-95 Tank

by Nathan N. Shiovitz

In September 1954, the Joint Chiefs of Staff approved a series of design studies on a family of three new armored combat vehicles. One of these, originally designated *TL-1*, passed into the developmental stage as an in-house program at the Army's Tank-Automotive Center and was redesignated *T-95*. The other programs, assigned to Ford and Chrysler, were short-lived and only a few *T-96* turret assemblies were actually fabricated.

As originally conceived, the *T-95* was to be a light, highly mobile, yet heavily armed and armored weapon. To achieve these usually conflicting goals, the *T-95* was to incorporate major innovations in all three principal subsystems — weapon, fire control, and chassis. The weapon was novel in two respects: First, it was to fire an armor-piercing, fin-stabilized, discarding-sabot (APFSDS) round from a smooth-bore tube. Secondly, it was to be trunnion mounted in the turret rigidly, without a recoil mechanism. The fire control system was also novel in two respects — it employed a light-beam ranging system, and all primary fire control elements were mounted in a substructure isolated from the main turret armor. Finally, the automotive assembly incorporated a flat-track suspension system and the (then) new *XT* transmission.

The APFSDS projectile fired by the 90-mm *T-208* gun was an arrow-like affair. The 37-mm tungsten-carbide penetrator was fitted with a wind screen and a stabilizing tube which also carried the shrouded fins. The arrow fitted inside its cartridge case and was centered and supported by a discarding sabot at the forward end, while vanes in the cartridge case aligned and guided the bore-diameter fins.

The external appearance of the complete APFSDS round was quite similar to the 105-mm APDS rounds now in use. The muzzle velocity of 5,000 f.p.s. and the low-drag projectile were expected to produce target effects similar to those currently achieved.

The long, slender, smoothbore tube incorporated an external ring in the chamber area and was



threaded for the breech-ring attachment. The shoulder ring was used to retain the gun in the gun mount which was made up of two cast armor sections split transversely in the plane of the trunnions. The interface incorporated machined pockets for the trunnion bearings and the two sections were held together by four large, approximately 2-inch diameter, high-strength bolts installed from the rear. The front section incorporated both the rotor and shield, and was machined to accept the gun-tube shoulder. An externally-threaded ring was screwed down, clamping the tube in place, and an external shield-cap completed the assembly.

Without recoil travel to open the breech after firing, it was necessary to provide for external operation of the sliding-wedge breech. Although no recoil system was used, the firing impulse was sufficient to cause the gun tube to stretch rearward a measurable amount. This motion was sensed and used to initiate timely automatic breech opening. Typical manual breech operation was also provided.

This method of mounting the weapon eliminated the cost, weight, and complexity of the recoil mechanism and minimized the requirement for mount maintenance and adjustment. At the same time, it reduced the size of the opening in the turret armor and the useful volume lost to the recoiling breech. This last factor also permitted the gun to be mounted higher in the turret without loss of gun depression.

The gun fire control system included the Optical Tracking Acquisition and Ranging (OPTAR) range-finder operated by the tank commander. The gunner was equipped with his periscopic primary sight and with an articulated, direct-fire telescope. The telescope, reserved for emergency use, was protected by an armored door in the turret nose and was mounted on the gun cradle in the conventional way. The OPTAR unit and gunner's periscope were, however, mounted in a quite unconventional way: Both instruments were mounted in a rigid, freestanding support structure which was, in turn, mounted to the

turret base ring. The instruments passed through clearance holes in the turret armor and were protected by ballistic covers attached to the armor and operated remotely. Clearance between the instrument substructure and the turret armor was sufficient to prevent armor deflections — due to nonpenetrating ballistic impacts — from causing damage or maladjustments. At the same time, since the turret armor no longer formed a part of the ballistic drive linkage, solar heating of the turret armor was eliminated as a source of boresight error.

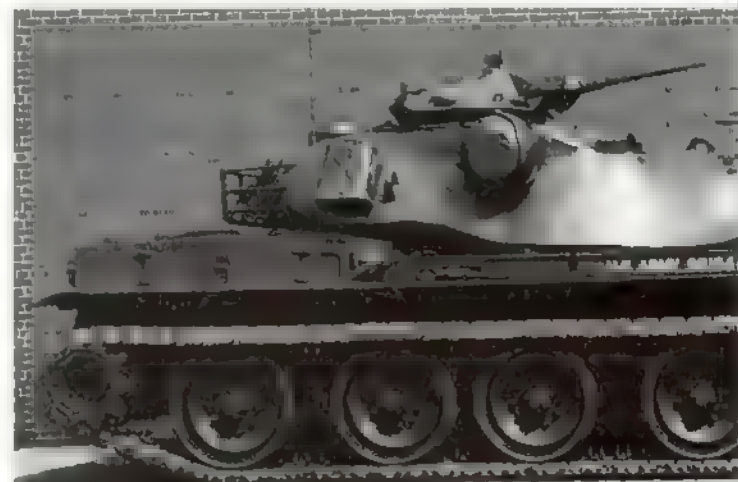
The OPTAR unit consisted of a light-beam emitter, a receiving unit, and an offset telescope system. The head assembly projected from the right side of the turret, protected by a large armor bubble, and was linked to follow the gun in elevation. The telescope permitted the commander to lay the rangefinder on the target selected for ranging. Pressing the ranging button triggered the pulsed light beam which, when reflected from the target and processed, resulted in a range reading. Although the transmitted light was shaped — by the emitter mirror — into a beam, spurious readings from fringe reflections were inevitable. The commander was required, therefore, to also estimate the range in order to differentiate between correct and incorrect range readouts.

The flat-track suspension system of the *T-95*, while new with respect to, circa 1950, U. S. Army tanks, had a long history of use in both the United States and in Europe. The application to the *T-95* featured a torsion-bar system which permitted an increased amount of wheel travel for improved ride characteristics. The *XT* transmission was an "austere" version of the familiar *CD* transmissions in that it sacrificed the pivot-turn capability for a reduction in its size and the number of parts required. A complete installation consisted of both transmission and steer-unit modules. It was expected that the modules could be developed in "families" which could be used, in various combinations, for both wheeled and tracklaying vehicles.

The *T-95* never reached production status because there were manifold problems exhibited by its revolutionary subsystems: The long, slender gun tube, required to achieve the high muzzle velocity, proved to be too flexible for accurate fire. The non-recoiling mount transmitted high G-forces into the turret structure which experienced failures in the turret-to-chassis attachment as a result. The OPTAR light beam rangefinder was difficult to lay accurately and vulnerable to damage. The *T-95* hardware, how-

ever, proved useful in later programs: The *T-95* chassis was fitted with a variety of turrets — *M-48* with 90-mm gun, *T-96* with smoothbore 105, *T-54* with rifled 105, and *M-48* with British 105 — and used in evaluating potential weapons for the proposed *M-60* tank. These combinations were designated *T-95E1*, *T-95E2*, etc. The chassis was also used as a test-bed for the *AVDS-1100* diesel engine and the variable-height suspension system and even as a test bed for an experimental gas turbine power pack. The original *T-95* turret, mounted on an *M-48* chassis, was used for the first *Shillelagh* weapon system installation and development testing.

The apparent failure of this program should be examined in the light of its very ambitious goals: Success required the development, in a comparative-

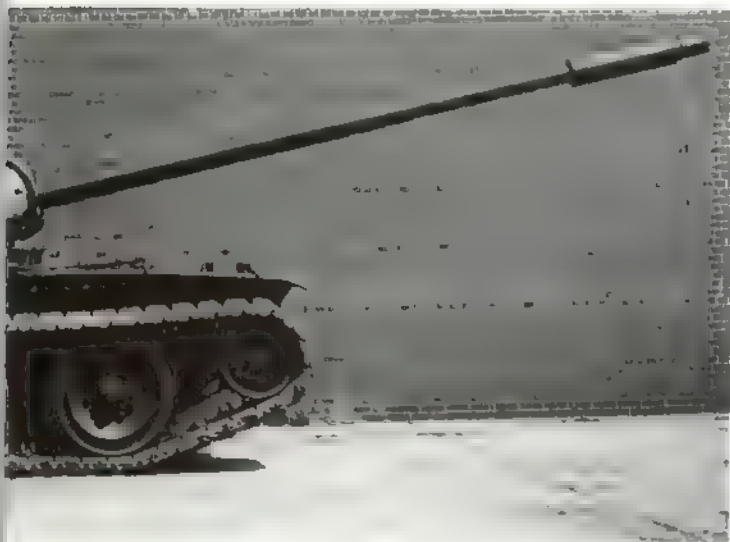


ly short period of time, of a whole new armament system, including the weapon, its complement of ammunition and its interface with the turret. At a time when state-of-the-art hypervelocity meant 3,600 f.p.s. at the muzzle, an increase to 5,000 f.p.s. was a formidable challenge. Achieving acceptable levels of bore wear and erosion and the development of a low-drag projectile were problems plaguing designers in other places 10 years after effort on the *T-95* came to a halt. The ranging techniques proposed and studied by the *T-95*'s designers were even longer coming to fruition in the laser rangefinders only now entering service.

In retrospect, it should be obvious that the appearance of failure comes only from the attempt to combine into a production-oriented program both basic research and applied engineering. The inevitable results of this combination are over-optimistic goals, excessive expenditures in time and money

and, finally, compromised and disappointing performance.

In order to assure the success of a development effort, the typical approach is to incorporate only those advances which have already been substantially proven. The "successful" new weapon system, therefore, represents the best that the state-of-the-art can provide in components and systems to meet the requirements of the current tactical doctrine for its employment. The controlling state-of-the-art, of course, is that achieved before the equipment design was released for production. Neither technology nor doctrine are static, however, and experience with equipment inevitably leads to changes both in methods of employment and in the required capabilities and performance of the equipment. The net result



of these changes is a more-or-less continuous program of modifications to "current" equipment, which permits the equipment to maintain its state-of-the-art currency, even as the art, both military and technical, advances. The evolutionary nature of this developmental process tends to increase the time required to achieve any given phase in that each improvement must be fielded before the experimentation leading to the next phase can be undertaken.

It is true, of course, that occasionally an area of improvement can be of such magnitude that it results in a "new" weapon system and initiates a new evolutionary cycle. The application of the British-developed 105-mm gun to an improved *M-48* chassis and turret, resulting in the *M-60* MBT, is a case in point. It should be noted, however, that the gun development took place entirely outside of the evolutionary development of the *M-48* series of tanks. Similarly, the development of the *Shillelagh*

missile, its gun launcher and conventional ammunition occurred in a program entirely separate from *M-60* development effort, but was later incorporated, resulting in the *M-60A2*. It is interesting to note that while the difference between the *M-60A1* and *M-60A2* is at least as great, tactically and technically, as that between the *M-48A2* and the *M-60*, the *M-60A2* did not receive a new, independent designation.

There is another approach, however, which merits serious consideration — to conduct a full scale research effort separate from the production design program. Free from the need to be "right" the first time and from the pressure of a production schedule, the designer can give free rein to his imagination, producing the "revolutionary" advances which are necessary for meaningful improvements in our weaponry. Viewed as a pure research program, the *T-95* was eminently successful. It pointed the way to later developments which are now being incorporated in "successful" development programs. The major-caliber APDS round, the laser rangefinder, even the smoothbore tank cannon, all "failures" in the *T-95* are the last word in modern weaponry now.

This is not to suggest that any hair-brained scheme be allowed to absorb the time, effort, and funds available for weapon development. It is reasonable to expect that a research program can be organized and directed to produce results — useful results worth their development effort. It is done constantly in other fields. Like aviation or medicine, the development of ordnance materiel can benefit from an organized and continuing basic study program divorced from the immediate need to produce equipment for troops in the field. Successful hardware programs are evolutionary. A properly exploited basic research program can make the evolutionary increments more meaningful, more timely, and, in the long run, much less costly.



NATHAN N. SHIOVITZ, a former World War II armor crewman, has been a mechanical engineer with the Detroit Arsenal and Ford Motor Company. He also worked in the Aeronutronic Division of Philco-Ford on the *Shillelagh* missile program. Mr. Shiovitz is currently associated with the special-purpose ground vehicle development activities of Lockheed Aircraft Service Company in Ontario, California.

Confidence Training for the Individual Soldier

"THE UNITED STATES ARMY must train its soldiers to fight and win the first battle(s) of the next war, and to fight and win those battle(s) outnumbered. . . Now more than ever we must all understand the dimensions of the modern armor battlefield. For only if we do can we build in soldiers the confidence and conviction that we can and will win."

The assembled officers of the Armor Training Center listened intently to the emphatic and convincing declarations of Major General Donn A. Starry, Commanding General, USAARMC. The Training Center Officers' Call had suddenly taken on a new and interesting tone. We were being bluntly exposed to what may have been for some the jolting realities of the combat environment of the future. The challenge to prepare for "The First Battle of the Next War" was amply evident throughout the address.

The General summed up, "It is also quite certain that the side that thinks it will win usually does. Conversely, the side that thinks it may lose, or whose soldiers are not convinced that they can and

Don't Tread On Me!

by Lieutenant Colonel
Homer L. Stapleton



will win, regardless of the odds, usually loses . . . Therefore, the United States must enter the first battle of the next war with soldiers whose state of training, whose confidence in themselves and in their leadership, and whose courage is such that they can fight successfully at odds of 10- or even 20-to-1 and win. Win through excellence in the effective use of weapons, win by using clever, effective, sound and carefully thought-out tactics. Win because they are better trained. Win because they are better led. Win because their courage and conviction tell them that they can enter a fight outnumbered and come out a winner."

Obviously, by the application of imagination and a realistic appraisal of our young volunteer's future combat environment to existing training programs, we can hone his professional capabilities to accommodate the imposing threat of being pitted against overwhelming odds. Plans are already in motion in training centers throughout the country to upgrade current training by introducing situational and more realistic tactical instruction into some rather humdrum, stylized programs. However, concurrent with the meticulous training, the exposure to laser-ranging fire control systems, sophisticated gun launchers and other ultra-modern, often baffling paraphernalia, we have another, equally important task to perform. We must shape in some cases, reshape in others, the soldierly character, the professional personality, of these young men. We must somehow introduce a considerable element of aggressive, self-confident obstinancy into his psychological makeup; an obstinancy that can easily be converted into an understanding of and feeling for the slashing, punitive tactics necessary to win the first battle of the next war.

It would appear, therefore, that we should apply a significant amount of innovative effort to creating training exercises which teach, however fundamentally and simplistically, the rudiments of the tactics which thwart massive enemy pressure and also develop the aggressive spirit that must exist throughout our ranks to produce success in that ultimately demanding combat environment. Somewhere between the reckless elan that sent the ill-fated Light Brigade against the heights at Balaclava and the inflexible devotion of the Spartans at Thermopylae, there exists the degree of self-discipline, self-confidence, and self-esteem with which our soldiers must involuntarily respond. What we're looking for is an attitude perhaps best represented by the venerated rattlesnake battle flag of the Culpepper Minutemen

during the Revolutionary War with its ominous allusions to swift and devastating retaliation, "DON'T TREAD ON ME." Or, to describe this attitude in the rock vernacular of today's youthful volunteer, we want a soldier who "has his head on straight" and is "meaner than a junkyard dog." Further, we should plant the seeds for this resourceful pugnaciousness during the soldier's professional infancy, to be carefully and purposefully nurtured thereafter in accord with his experience and potential.

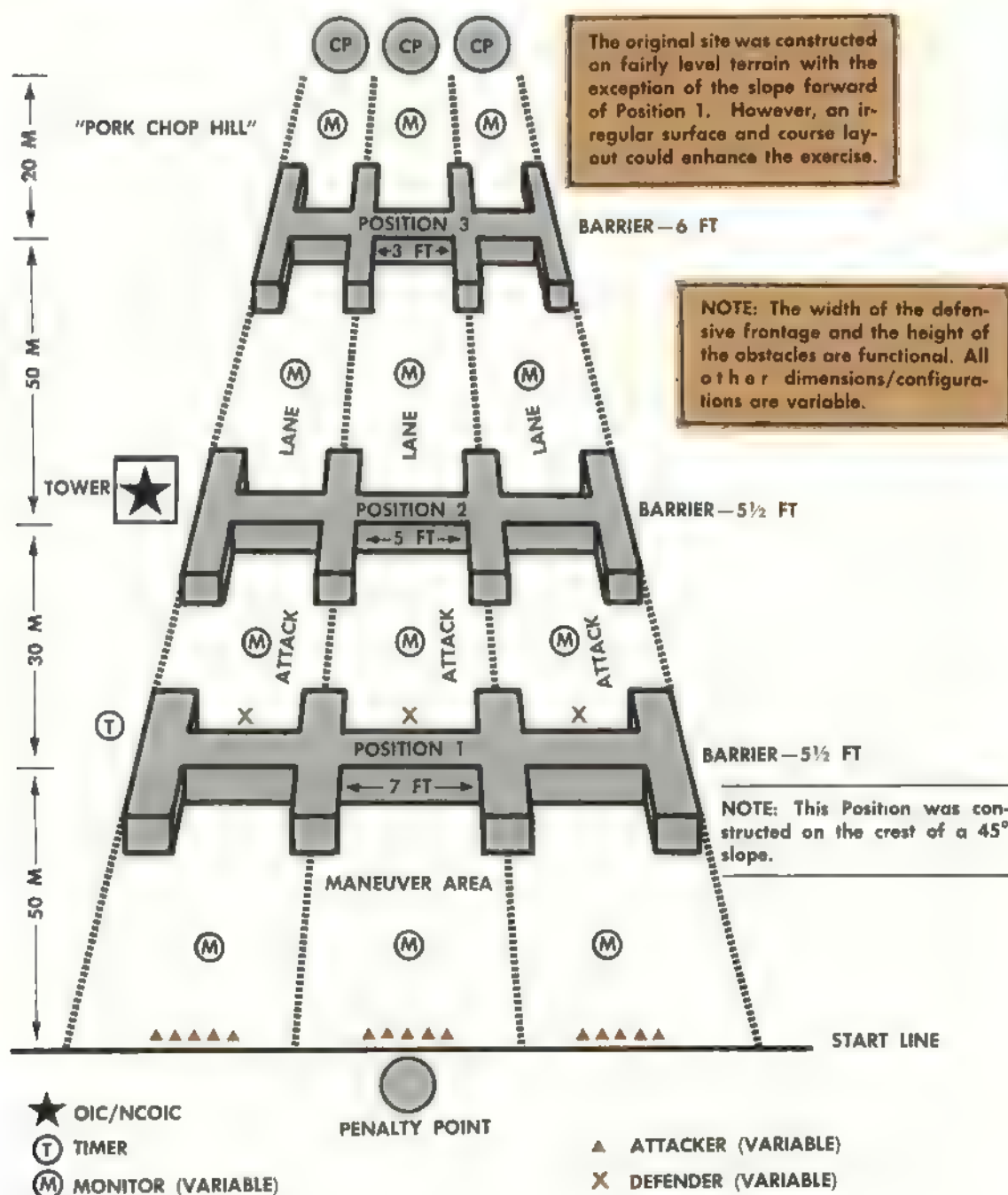
The blustery January day that followed the intriguing officer's call presented a problem that in itself appeared rather bleak to key officers and non-commissioned officers of the 2d Battalion, 1st Advanced Individual Training (AIT) Brigade. How and where could we begin to build a "DON'T TREAD ON ME" attitude within the constraints of resources already available to us and without a major disruption of a tightly scheduled eight-week Armor Crewman Course? After considerable discussion, the following guidance was formulated:

- The primary objective will be to create a spirit of self-confidence in the individual trainee and convince him that alert, aggressive, defensive action will produce commensurate survivability against great odds.
- The secondary objective will be to convince the trainee that persistent, innovative teamwork can produce offensive success in the face of a determined, well-prepared defense.
- The exercise must contain the capability of inducing and varying considerable offensive odds against the defender.
- Whatever facilities are constructed should give the individual defender advantages equivalent to those a unit might accrue through good use of terrain, obstacles, movement, and concentrated firepower in depth.
- Conversely, the construction should give the attacker little advantage other than numbers and purposely restrict him as would a tactically sound and aggressively executed defense.
- The facilities and the exercise format should accommodate at least a 30-man platoon.
- The individuals participating should be physically stressed to the maximum.
- Rules of engagement should be developed that preclude serious injury, but produce an environment of desperate struggle.
- All construction must be accomplished by troop labor and without the commitment of additional funds.

Tasks were assigned, and the company commanders and selected drill sergeants moved off to contemplate, leaving behind them a trail of obstructive comments and veiled implications that, with gray hair, comes a certain irrational disregard for the status quo. But, as was fully expected, and in short order, the "Young Lions" returned with ingenious schemes for format and practical solutions to the problems of an appropriate area, the acquisition of construction materials, and the modification of training schedules.

Thus, during the next two weeks of assembling

ammo boxes, sandbags, salvage canvas, railroad ties, gravel, nails, and willing volunteers, the proposed "Five-on-One" exercise was born. (See figure 1 for course dimensions and layout.) Before proceeding to describe the resulting program of controlled mayhem, a point should be made. This is only one idea, among a potential galaxy of ideas that could serve to fortify the combat soldier for the environment of deadly desperation that may be his lot in the future. The following is an extract from the Letter of Instructions distributed to companies of the 1st Brigade:



Defensive/Offensive (5 on 1) Exercise

1. Objective: To create a spirit of self-confidence in the individual trainee and to convince him that alert, aggressive defensive action will produce commensurate survivability against great odds (5 to 1). Also, to convince the trainee that aggressive, alert, teamwork can produce offensive success in the face of a determined, well-prepared defense.

2. Scheme of Maneuver: Five (5) trainees compose the attacking team in each lane. One (1) trainee will defend each lane. The defender will defend 3 prepared defensive positions in a sequence demanded by the tactical situation. The five-man offensive team will be given a time limit to penetrate the three defensive positions in the assigned lane in order, so that at least 3 of the attackers gain access in the defender's CP located to the rear of the defensive system.

3. Rules of Engagement:

a. Defender: The defender

may use any means short of striking blows to hold his position. He may use hands and body to push, shove, or obtain an attacker's "flag," or eject the attacker physically from his position. The defender may maneuver without restriction during withdrawals. The defender may choose to defend one, two or all of the defensive positions. If the defender keeps at least three of the five attackers from reaching his CP within the time limit, he is the victor.

b. Attacker: Five attackers must assault the prepared defensive positions in the assigned lane in order, forcing the defender to withdraw depending on the pressure applied. They cannot grab or contain the defender, but must concentrate on individual penetration to win the game. Each attacker will wear a "flag" (colored cloth held by a belt at his sides). If after, or while, penetrating the defensive position, the defender obtains and grounds an attacker's



"flag," the attacker must move with all possible haste to a "penalty point" placed approximately 50 meters forward of the initial defensive position, readjust his "flag," and return over each defensive position before rejoining his team in the fray. Again, if the attacking team can place 3 of its members in the defender's CP within the time limit, they are the victors.

4. Lessons Learned:

a. Defender: The defender learns that a small force, well-positioned and prepared, can survive against what would ordinarily be overwhelming odds. He learns to be alert to enemy pressure to his front and rear. He is exposed to the "feel" of his situation and hopefully to the advantages afforded by timely withdrawal. In the area between defensive positions, swift counterattacks to obtain "flags" forward of defensive positions will lessen the pressure. He gains appreciation for "holding on" for a given period of time. He is acclimated to the fundamentals of defensive tactics. He is physically tried.

b. Attacker: The attacker learns the folly of an uncoordinated attack. He experiences the success provided by teamwork and quick thinking. He must maintain a determined offense in the face of a spirited and well-prepared defense. He learns that rash attacks suffer penalties and reduce the capability and the momentum of the team effort. He is physically stressed.

5. Facilities: Each successive position is constructed to reduce the frontage that can be attacked (4 attackers abreast can gain access to defensive wall on Position #1, only 3 attackers on Position #2 and 1 attacker on Position #3). Thus, it becomes more and more difficult for the attacker to bring pressure on the defender unless he gains penetration early in the game. The approaches to each defensive position are constructed to funnel the attack into a restricted front, compelling

attackers to coordinate their attack among themselves.

6. Cadre/Referees/Monitor

Personnel:

OIC/NCOIC—gives instructions prior to the game, supervises the exercise, cautions attackers and defenders about rule infractions, directs activities of lane monitors, and has overall authority. He may halt the exercise at any time he sees a dangerous or potentially dangerous act.

TIMER NCO—accompanies players from start point to finish point (command post), indicating the end of each delay period with his whistle. He keeps time for each successive position. The time limit for the defense to win is a total of 9 minutes; 1 minute on Position #1, 3 minutes (including movement between positions) on Position #2, 5 minutes (including movement between positions) on Position #3. Time starts when the first attacker reaches Position #1. If at any time prior to 9 minutes, three members of the offense reach the defender's CP area, the offensive team wins and the exercise is concluded.

LANE MONITORS—total of 12 (optional). NOTE: One NCO supervising action at each position will suffice.

a. One per lane (total 3) will monitor the return of attackers to the penalty point at start line for replacement of flag.

b. Three per lane (total 9) will insure fair play between Positions #1 and #2, Positions #2 and #3 and Position #3 and CP as follows:

(1) Control action by insuring attackers and defenders obey rules, and supervise the return of flag droppers to start point.

(2) Alert NCOIC of possible injury.

(3) Alert NCOIC of action that should be penalized.

(4) Lane monitors at finish line must insure that no attacker enters the CP area without his flag.

* * * * *

This basic format allows the OIC/NCOIC to supervise three parallel wars, one in each lane. The need for monitors to enforce the rules diminishes as the participants become acclimated through repetition and are more deliberate about their maneuvering. Additionally, as familiarity with the exercise grows, the innumerable variations that can be applied to the original theme begin to appear. For example, one company commander introduced defensive and offensive commanders, each with a reserve force to employ, thereby emphasizing leadership, expanding the number of participants, and promoting a deeper understanding of basic tactics by the trainee. The use of tactical commanders usually negates the need for a timer other than the OIC. Another scheme of maneuver gave the offense a reserve and allowed them the flexibility to attack in any two lanes of their choosing. This forced the defenders to quickly shift their strength to meet the pressure.

One commander, bent on clarifying the timing and "feel" of the withdrawal, provided the offensive team



with a reserve, but occupied both Positions #1 and #2 with defenders. His instructions for the defense of Position #1 were, "Stop their first charge, then step back and go for their flags. Don't get tangled up wrestling with them. In other words, don't get decisively engaged. You've got to be free to withdraw through Position #2 and occupy Position #3. You men on Position #2 hold at all costs." The Donnybrook that resulted was an enthusiastically celebrated victory for the six defenders and, hopefully, a long to be remembered lesson in lack of co-



ordination for the 20 disorganized attackers. After most of the platoon had been rotated through both offensive and defensive roles, and four full blown assaults/defenses had been completed, the battered troopers retired to a shaded area for a short debrief. Reassuringly, in answer to the questions of the OIC, the positive, confident retorts of the trainees showed a solid understanding of the tactical rudiments the commander had set out to teach. They had been completely involved, physically and mentally, in each of the numerous fundamentals of a mini-combat setpiece. Aching muscles, bruises, and a split lip or two gave ample evidence that undoubtedly some teaching points had been pressed home with vigor. But, the most rewarding indication of that productive hour were the comments of one cocksure, but obviously bone-sore trooper the following day in the battalion motor park. "I was up on Pork Chop Hill yesterday, Sir, and there wasn't none 'o those guys made it to my CP."

The capability inherent in Pork Chop Hill type of exercises to teach basic tactics is more easily defined than the psychological benefits. With modifications and improvements, such as varied terrain, strict use of proper tactical terminology and simply stated briefs and debriefs to set the stage and insure understanding, the following offensive/defensive fundamentals can be easily incorporated into any training session either singly, or in whatever combination is desired:

Offense:

1. Movement to contact.
2. Hasty attack.

3. Deceptive attacks, such as feints and demonstrations.
4. Deliberate attacks to break through to a limited objective.
5. Operations to identify enemy weaknesses. Attack on a narrow front to produce concentrated odds that favor success (6:1).
6. Break through enemy weak areas using suppressive means of all kinds.
7. Drive deep for the CP, logistical elements, trains.
8. Don't pin success on the frontal assault.
9. Seek to confuse the enemy as to what your plan is.
10. Be ready to pass fresh units through those leading to keep up the momentum.
11. Speed and violence are essential.
12. In a breakthrough, don't tell off units to protect your flanks.
13. Slide off, slip around, seek soft places.

Defense:

1. Defense is necessary when the enemy is stronger, has the initiative, or when you are required to gain time, hold a vital area, hold to permit concentration elsewhere, to inflict casualties on the enemy at a rate of 5 to 1 or more.
2. Know the threat, weapons, tactics, situation.
3. Move to concentrate against the pressure.
4. Counterattacks are required for a successful defense.
5. Defense must be laid out in depth.
6. Destroy what you can and take up the defense again before the next enemy echelon arrives.
7. Set up a Covering Force Area, Main Battle Area, Rear Area.
8. Conduct your defense by:
 - a. Moving forces to concentrate. Try to avoid being outnumbered more than 3 to 1.
 - b. Anticipate where the enemy will stage his breakthrough attacks.
 - c. Use to best advantage all inherent assets of defense, recon, prepare, dig in, etc.
 - d. Fight on successive positions in depth.
 - e. Weaken the enemy progressively.
 - f. Get the enemy out from under his air-defense (AD) umbrella and make him expose himself.
 - g. Get the enemy into a running battle so artillery and AD are moving.

With a little imagination, any of these fundamental teaching points can be read into the "Pork

Chop Hill" script on a given day. Currently, our soldiers experience only the most cursory exposure to unit tactics during the 16 weeks of the pre-assignment training period; an orientation film here, an overnight bivouac there. But, how often are they given the opportunity to engage personally in an exercise that, however simplistically, provides them the "feel" of the larger company, battalion, brigade effort? Designate a five-man team of attackers as a company. Call the entire group of 20 a battalion. Explain that Position #1 is the Covering Force Area and the three defenders are the Covering Force. Make Position #2 the Main Battle Area and coach the defending team commander to plan to concentrate his defenders there. Piece by piece, day by day, this tactical neophyte of ours will begin to see the basics of the big combat picture. No vehicles, no huge maneuver area, no fuel consumption, no ammo requirements are involved, just bodies, sandbags, physical energy and forearms.

In summary, it is now necessary for us to instill in our soldiers a certain self-confident obstinancy and a fundamentally solid understanding of the tactics and the environment of future combat. They must realize from the very beginning of their military experience that the hell-for-leather charge is usually not the best solution to most combat situations. They must be convinced that coordination, control, cunning, and confidence will be required to fight and survive in "the first battle of the next war." Therefore, a scale model Fulda Gap, a miniature Hof Valley and, for lack of something better, the meager, pinch-penny facility described herein should be built. It will pay off. Ask any sweat-soaked, bloody-nosed "veterans" of 1st Brigade's "Pork Chop Hill" what they think about it. They'll tell you with a boast, a challenge, a swagger, the set of their shoulders, "DON'T TREAD ON ME."



LTC HOMER L. STAPLETON was commissioned in Armor in 1955 through the ROTC program at Ohio State University. He has served as a District Advisor RVN, and as tactics instructor at the Artillery School. A CGSC graduate, Colonel Stapleton commanded an AIT battalion prior to his current assignment as Deputy Commander of the 1st AIT Bde, Fort Knox.

THE TANK THAT WAS AHEAD OF ITS TIME

Soldiers manning defensive positions surrounding the beachhead rubbed their eyes in disbelief as dawn's first light revealed several tanks emerging from the surf as others approached the beach from the sea — a sea upon which not a single ship could be seen.

Where had this armored force come from? Air dropped perhaps? No, not the faintest sound of aircraft had been heard.

These tanks, that were now pounding the defensive positions, could have come from but one place — a submarine.



Impossible?

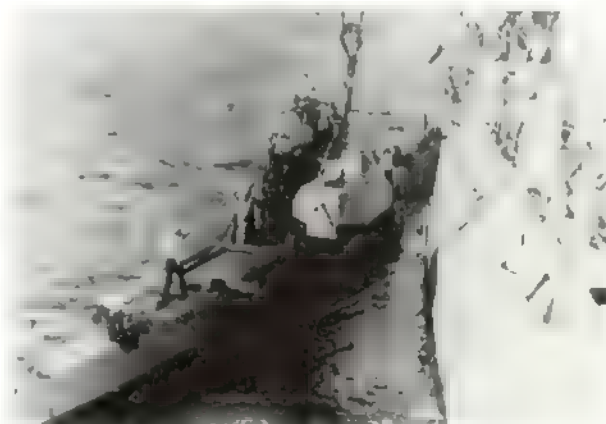
Perhaps, but J. Walter Christie didn't think so back in the early twenties when he actually built an amphibious tank that was launched from a submarine during maneuvers conducted off the island of Culebra near Puerto Rico in 1924.

Christie, the inventor of one of the world's finest tank suspension systems, began work on his amphibious vehicles in 1921, when he produced an amphibious self-propelled gun carriage that successfully swam the Hudson River.

By December of 1922, the amphibious gun carriage had been refined and was put through tests that received considerable publicity — most of which was favorable. The *New York Times*, for instance, reported that Christie's vehicle was expected to revolutionize "modern" warfare.

Not all representatives of the Armed Services, however, were quite so enthusiastic. The observer for the Army Tank Corps, for example, reported that, although the Christie amphibian was the most remarkable vehicle he had seen, he considered it to be only a gun mount and questioned the high cost of converting it into a tank.

Undaunted by the Army's evaluation of his vehicle, Christie turned to the U.S. Marine Corps and convinced Brigadier General Smedley D. Butler, commander of the Marine Corps Expeditionary Force, to use the amphibious tank during the 1924 maneuvers on Culebra Island.



The tank was deck-loaded aboard a submarine which carried the vehicle to a point near shore and then submerged to allow the amphibian to float free and proceed toward shore under its own power. However, the experiment was only partially successful. After launching, the tank swam several miles, but was unable to land through the high surf that was running at the time.

Although the amphibious tank failed to demonstrate its seaworthiness completely, the majority of the Marine officers who saw the vehicle in action were enthusiastic about the possibility of its future use. This was particularly true of the infantry officers, who recognized its value in making river crossings to neutralize machinegun positions on the far shore.

But then, as now, the enthusiasm of a few visionaries was overwhelmed by the realities of a "money crunch" and the decisionmakers' inherent resistance to change and innovation. Christie was unable to sell his revolutionary tank to the Marine Corps and was forced to seek markets for it overseas. As a result, it would be nearly two decades before U.S. Armed Forces would acquire a tank that could swim. *Based on information supplied by George F. Hofmann, Cincinnati, Ohio. — Ed.* □



THE HOBO AND DER SCHNELLE HEINZ:

Craftsmen

by Kenneth Macksey

Schnelle Heinz — General der Panzertruppen Heinz Guderian.

Over the ensuing 2 years, Guderian was to win striking victories and become a national hero, but at the end of 1941, would be dismissed for disobeying orders. Hobart's dismissal came much sooner; within a few days of 1 September 1939 he was relieved of command because he was found guilty of fostering a pernicious doctrine which exaggerated the importance of the tank. In due course, each would return to command, but by then, their ideas, so recently rejected as too unorthodox, were enshrined in routine.

What was it that invested these two hard, dynamic men with a common style, purpose, and farsightedness? How was it that they arrived at parallel solutions in organization and methods for the execution of new ideas?

Hobart was born in 1885; his German counterpart, 3 years later. Significantly, neither came from families that were steeped in military tradition. Hobart's father was Irish, an Indian civil servant; Guderian's father, a Prussian, was the first of the family to become a soldier, although his mother's family was strong in military tradition.

Therefore, it is understandable that Guderian would be more inclined to follow a military career than would Hobart. However, once Hobart had decided upon a military career, at the age of 12, his dedication was absolute.

Although Guderian's education was the more militarily biased, Hobart was the better qualified in experience in active service and in technical ability when World War I broke out in 1914.

Guderian, a light infantryman, had specialized in wireless telegraphy, besides spending a year at the War Academy. On the other hand, Hobart, an engineer, had superior knowledge of signalling and staff work. He participated in resurveying and organizing the Indian Durbar of 1910, and was in active service under fire on the Indian frontier.

The concept of massed tanks and armored carriers moving at high speeds, in unison, under the command of one brain is now so common that it seems incredible that, not so long ago, it had to be fought for by a few dedicated enthusiasts against the combined forces of the military pundits of the day.

Today, it is easy to forget the names and maverick characteristics of the generals who, 50 years ago, recognized the potential of the tank to dominate the battlefield by operating in the deep penetration role, and who turned that idea into reality.

Casualties among the most active pioneers were high. Of the dedicated handful in Europe, only two were actually in command of an armored formation when the first great tank war broke out on 1 September 1939, and only one of them was actually to lead tanks in battle.

By unbridled enthusiasm, these two had pushed the armored (or panzer) divisions to the moment of revelation and, in the turmoil, won indelible reputations for seething energy alloyed with courtly charm, caustic repartee, tactlessness and, when obstructed, rude intolerance, which, in the end, retarded and, to some extent, wrecked their careers.

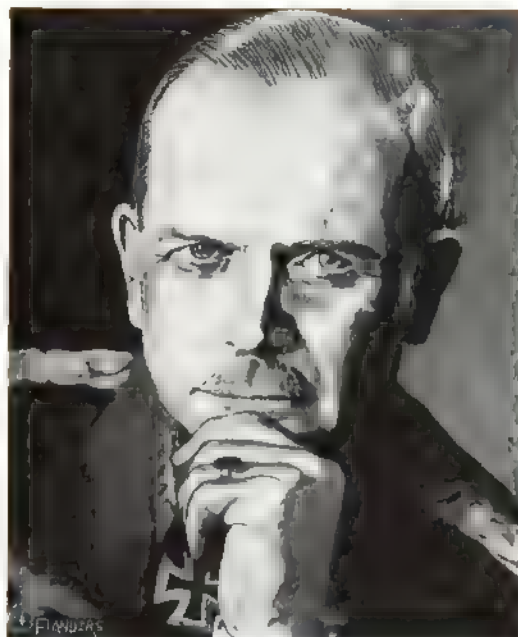
In Egypt, waiting to meet an Italian invasion at the head of the ill-equipped, but superbly trained 7th Armored Division — that was to become famous as the "Desert Rats" — was the Hobo, Major General Percy Hobart. In Prussia, directing the initial thrust against Poland as commander of the newly formed XIX Corps (comprised of a panzer and two motorized infantry divisions), stood Der

in Armor

The stress of World War I did not allow Guderian much scope; his part in the van of the initial drive on Paris was exciting enough, but was almost terminated when his wireless station was overrun during the retreat from the Marne. His World War service then followed a routine pathway, with almost all his time being spent on the staff in France. Hobart, on the other hand, was in the thick of the trench fighting in France throughout 1915. Then, for the remainder of the war, he served as a staff officer in Mesopotamia and Palestine in jobs filled by variety of experience, as well as dire peril when reconnoitering enemy positions from the air. Not that Guderian shirked danger, because like Hobart, he too was quick to appreciate the value of aerial reconnaissance. Both flew repeatedly in the search for intelligence and Hobart was shot down once.

Neither, however, had contact with tanks until after the war. But while Guderian has written that motorized troops were of little importance to him until 1922; Hobart showed immediate interest. He had often witnessed them in long-range operations in the Mideast, and had gained personal experience with armored cars in action when they rescued him under fire from behind the Turkish lines. Indeed his presence behind the lines is endemic to this study since he had gotten to Turkey due to flying on a reconnaissance mission in that direction contrary to orders. It was this willingness to disobey which was a vital, shared characteristic of both he and Guderian, that, in the final days of World War I, caused setbacks to both careers.

Hobart was removed from his post in 1918 for expressing too forthright an objection to authority; and Guderian, in the turmoil of political revolution in 1919, deliberately adopted a political stance by resisting specific orders from von Seeckt, the future Commander-in-Chief. It speaks highly of the standing in which they were held by indulgent superiors that these escapades were not permitted to blight two promising careers. In survival, however, they



discovered that authority could be challenged with profit.

At the same time, they came under the influence of one of the most penetrating, audaciously independent military intellects of the epoch — Colonel J. F. C. Fuller.

Fuller personally inspired Hobart to recognize that tanks and aircraft held the key to the future of land warfare, and persuaded him to transfer to the Tank Corps in 1923. It was Fuller's writing which, above all, conditioned Guderian's initial thoughts, no matter what he may have written after 1945 about the influence applied by others. Fuller threw down a challenge to the unorthodox, and fell by the wayside. Hobart and Guderian carried it forward, each in his own country, throughout the 1920's, lecturing, as Staff College instructors, in propounding the boundless opportunities offered by armored warfare.

For historical reasons, Hobart took the lead in practical work. In 1927, he became involved in exercises with the first all-arms experimental mechanized force (the real precursor of armored or panzer divisions). It was 1929 before Guderian even drove a tank — in Sweden.

The Treaty of Versailles prohibited Germany from having tanks of her own, and everything about armor had to be learned and won by subterfuge. Thus, while Hobart was commanding a battalion of tanks in 1932 and a brigade in 1934, Guderian's experience in 1931 related only to mockups in wood and tin carried by cars and lorries. Even by 1934, when he became Chief of Staff to the German Armored Com-



mand, he could call on only a few prototypes and light tanks to conduct his experiments. Vehicles, of course, catch the eye and imagination, but the most important area of agreement between these two prophets was their demand for command and control of tanks, units, and formations through radio — and their complete faith, contrary to all then current opinion, in its feasibility. Hobart said, “If you really believe in wireless, it will work” — and proved it in his brigade. Guderian, a master of advanced radio experiments, needed no further convincing, and proved tank-to-tank communication in 1931. He had learned his lessons by experiencing the failure of German radio control in 1914 and by 1934, had read of Hobart’s success with radio communication.

The year 1934 marked a turning point in their fortunes. Hobart and the other British tank pioneers began to meet solid resistance to their ideas. By 1937, he was complaining that “I can never get anyone to paint any sort of picture of what the battle area might look like . . . but all agree in condemning my practice.” Already he had been overtaken by Guderian, who confirmed that “Hobart’s exercises in 1934 gave him an answer to many queries — and an inspiration.” It is true there was strong resistance within the Germany Army to Guderian and that he, like Hobart, was to understand from the outset that a tank force is expensive and could only be built within the confines imposed by financial and industrial capacity. Hence, both were limited to lightly armed and armored machines.

Unlike Hobart, Guderian had the valuable support of his Head of State and Supreme Commander, Hitler, even if the evidence shows that Hitler regarded panzer divisions more as a propaganda device than a decisive instrument of war. Far too much has been made of Guderian’s quote of Hitler saying in 1934, “That is what I want.”

Marked resemblances in the product of their labors began to appear. Even if the British did build heavily-armored tanks of a strength desired, but not attempted by the Germans, they also produced fast,



Col. J. F. C. Fuller

lightly-armored machines armed with guns of a caliber similar to those of German design. Moreover, the original composition of the first German panzer division, immensely heavy in tanks, but balanced in infantry, was quite like that first proposed and tried by the British, who only later reduced the infantry content. There was common consent that one wireless set per tank was essential, a proposed scale which met stiff resistance in Germany, and one for which Guderian fought every bit as hard as he did for better, battle-worthy tanks.

Provocation, often deliberately applied by their opponents, wore down the tolerance of Hobart and Guderian to the point that it was almost impossible to debate the subject of mechanization without having a row. In addition to a reasoned confidence in plans they felt demanded support, there was a strong feeling of personal loyalty to the tank forces they had raised, a feeling of duty toward their subordinates, which completely overrode the call for caution in nourishing their own careers. As the angry debates continued, the British and German adherents to armor forfeited the support of friends, and turned opponents into outright enemies amid an atmosphere of fear and hatred. The attempts to convert old-fashioned foot and hoof armies to mechanization brought direct confrontation with the Cavalry, the Infantry, and above all, the Artillery. Hobart and Guderian bore the brunt simply because they shouted loudest.

In the projection of their propaganda, however, they were unlike, for while each was well versed in manipulating bureaucracy in the War Ministries, Hobart suffered from a shorter patience and was, therefore, the quickest to antagonize those whom he needed to persuade. The force of circumstances compelled him to act hastily as time passed, and as the German threat — particularly the one posed by Guderian and his panzers — became apparent, he felt impelled to push harder, when to hesitate might have been more tactful and more fruitful in the long run.

Guderian, on the other hand, had time on his side and was shrewd at recognizing the moment when an initiative, forced by his strong persuasive powers, would meet least resistance. His patience was superior to Hobart's, though his temper was no less violent when lost.

Another advantage Guderian possessed, that perhaps was the most important of all, was the ear of the Head of State. Hobart's political ally — Winston Churchill — was lukewarm to tanks and cast adrift in the political wilderness. Guderian had a close understanding with key men in the command hierarchy and was well regarded by senior officers whom he had served, and who were taking post as successive Commanders-in-Chief. Hobart had scantier influence, and was compromised by the nature of his marriage to a divorcee in 1927 that had smacked of scandal.

In those days, several officers in the British Army (and particularly their wives) took the view that at least three institutions should be free from the taint of divorce — Royalty, the Church, and the Army. Hobart's chance of advancement might have been enhanced had he, like Guderian, married a wife

whose cousins were the British equivalent of the Military Secretary (Bodewin Keitel) and the Chief of the Defense Staff (Wilhelm Keitel). As it was, he did extremely well on merit, as did Guderian.

The advent of war gave Guderian the chance to prove that which Fuller had taught him and Hobart all too well, for the results of panzer tactics gave fresh life to wars of quick and relatively cheap decision. Stalemates were obviated, and small *corps d'elite* won striking victories. It was a mark of the Hobart and Guderian touch that the members of the *corps d'elite* were bound together by an extraordinary *esprit de corps* and a belief in the importance of their mission to prove an idea right.

In leadership, however, appeared the crucial difference in the personal way they encouraged their men. While Hobart was rough with all ranks and ruthless as a sacker of the allegedly incompetent, Guderian rarely sacked, and obtained the best from his followers by a bantering encouragement that won willing acquiescence and sacrifice. Hobart's men respected and yet feared their leader: Guderian's troops respected and were devoted to him.

But both were held in trepidation by their superiors; although Hobart may have grown a little milder as he progressed under the encouragement of Churchill, while Guderian suffered under the demagogism of Hitler.

In a desperate moment in 1940, Churchill brought Hobart back from the wilderness and kept him in command when, at a later date, his enemies tried once more to remove him. Guderian was less fortunate when Hitler, at the first sign of Guderian's opposition to his policy, dismissed him, and only brought him back in 1943 when nobody could be found capable of rebuilding the panzer force that



had been virtually destroyed in Russia.

History conspired to demonstrate the duality of Hobart's and Guderian's purpose and methods. In the aftermath of Dunkirk, when British armored forces were being expanded and remodeled as the result of the lesson given by Guderian, Hobart, at the invitation of the War Office and spurred on by Churchill, drafted a Charter for a Royal Armored Corps (RAC). He demanded that its commander should have Army Council status, and would be responsible for training and the design and procurement of equipment. He thought it must be comprised of "wholly-armored battle formations, unhampered by unarmored formations and not tied to, or clogged by infantry formations," a force that would include its own motorized artillery, infantry, engineers and parachutists, and have an air element. This meat was too strong for the Chief of the Imperial General Staff (CIGS) and the Commander of the Home Forces (respectively Dill and Brooke, who were both gunners). The Commander of the RAC was reduced eventually to the role of an inspector with the responsibility mainly for raising and training an armored corps, but with power only to make suggestions. Hobart would have nothing to do with this "rotten organization," as he called it, and opted for an armored division. The weak appointment Hobart had refused was little different from the one to which Hitler, at the suggestion of the German Commander-in-Chief Von Breuchitsch, had imposed upon Guderian in 1938, and which Guderian had unwillingly accepted and found almost unworkable, due to the obstruction of the German Cavalry, Infantry, and Gunners.

When the aftermath of Stalingrad demonstrated the ruin of the German Army, it was Guderian's turn, at Hitler's invitation, to submit proposals for a Commander (Inspector General) of Armored Forces to repair the damage to the panzer divisions caused by the ravages of 2½ years of war and neglect. It is fascinating to find that he submitted a scheme for an armored force which, in its inception, was almost an exact reflection of Hobart's 1940 proposal. Not surprisingly, it also met resistance similar to that thrown against Hobart's scheme; the hottest fire coming from the many gunners who infested the German High Command. But Guderian's charter, short of control of assault guns, the air force, and SS formations, survived though, simply because it had Hitler's blessing. It is all the more interesting, therefore, to recall that, at about this time, Churchill was recording his regret that he had not fully supported

Hobart in 1940 in order to put British tank forces on the right line.

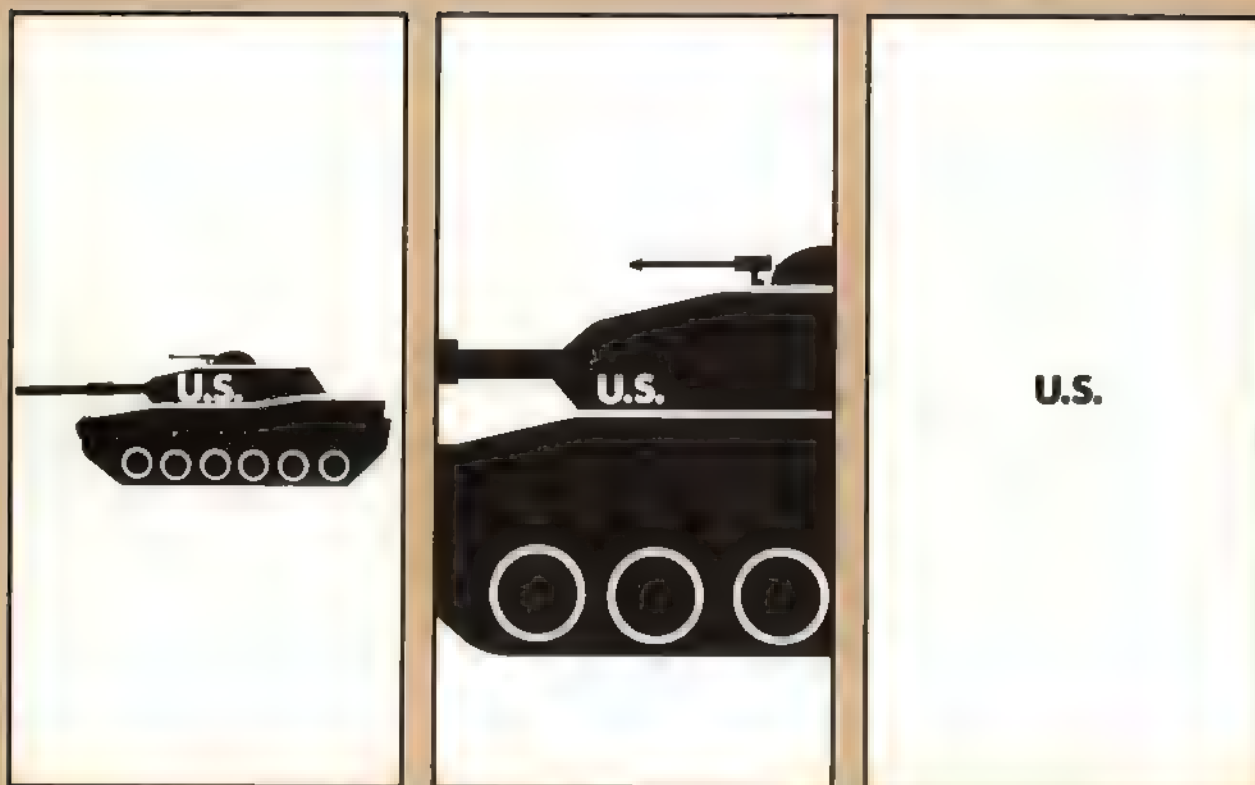
Nevertheless, it is the reactions of Hobart and Guderian to their destiny that, perhaps, delineates most sharply their respective claims to any consideration for appointment to high command. Hobart's refusal of the post of Commander Royal Armored Corps was taken partly in the belief that opposition to him within the War Office was so deeply seated as to extinguish all hope of his overcoming an ingrained resistance. In addition, he seemed to have lost some of his self confidence. "I am damn bad with my superiors," he wrote in 1941.

Guderian also suffered from resistance by superiors, but possessed such depth of character that he frequently shrugged it off or carried them with him. Above all, he never abandoned confidence or lost his supreme optimism. He always believed that his policy was practical. When challenged after the war as to the correctness of bringing the armored forces under one commander, he retorted, "The work of the Inspector General did not lead to any 'duplication of effort', nor did it cause any lack of uniformity in tactical views." And on another occasion, "Disadvantageous results from this organization are unknown to me."

The fact remains that Guderian became Chief of the German General Staff, and Hobart remained a division commander (albeit with special influence). While Hobart's name may become only a footnote to history, chiefly in connection with the raising of the armored forces which stormed the Atlantic Wall in 1944, Guderian's is likely to endure as that of a Great Captain, one whose creation of the German Armored Force elevated him to the level of Gustavus Adolphus — a general who raised a modern army of strikingly original powers and led it in person to total victories on the battlefield.



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Tank, Supertank, or No Tank At All

by Major L. D. Holder

The debate over the "death of the tank" has sputtered on for several years and, now, stoked with additional fuel provided by the outcome of the latest war in the Mideast, it has taken on a new edge and a fresh criticality. Journalists, politicians and, naturally, soldiers are finding the issue increasingly interesting to the public at large. And, with our army in the market for a new main battle tank, the controversy has become much more than an academic exercise. For the first time, there is a danger that the heat of the discussion and the nature of our response may lead to an extreme and faulty solution to the problem.

After years of repetition, the lines of the argument for the tank's demise are familiar. New, relatively inexpensive and increasingly effective antitank weapons are in production all over the world. For many analysts, the possibility of fielding these weapons in great numbers makes the future value of armor units questionable. Faced with a potential torrent of air-dropped, man-packed, helicopter-launched and, soon, artillery-fired antitank devices, the tank, once

supreme on the field of battle, will supposedly become a hunted anachronism. To aggravate its increased vulnerability, these critics continue, the tank contributes to its own obsolescence by going up radically in price at a time when exchange ratios between itself and the cheaper antitank weapons are already lopsided.

Despite this and despite having seen the *MBT-70* project scrubbed because of its high cost, some planners persist in advocating the procurement of the relatively expensive *XM-1*. That, naturally, strengthens the convictions of those opposed to further use of the tank, and intensifies the problem of securing a new standard tank.

Perhaps the arguments against the viability of the tank and the simultaneous developments in tank design in this country are pulling us in two mistaken and dangerous directions at once. It seems fairly clear that, given the experience of modern armies, the tank is still far from being anachronistic because its unique capabilities ensure its survival despite the new dangers that it faces. Additionally,

it seems very likely to me that the main lines of tank development here are incorrect, or at least out of balance, and that they *do* raise serious questions about the survivability and effectiveness of *American* tanks in future wars — or even about their “procurability” in peace. What I propose is a more careful analysis of the future battlefield by those favoring outright elimination of the tank and a rethinking of the essence of armored combat for those at the other extreme who propose the adoption of \$1 million tanks.

The first point — *the extinction of the tank* — is easily refuted in spite of the impassioned arguments of those who proclaim the tank’s passing. The very multiplication of counterweapons which gives rise to concerns about the tank’s survival testifies at the same time to its importance. All armies still perceive a considerable threat from the modern tank. The new antitank weapons are, no doubt, reliable, deadly, and increasingly cost-effective; in defensive positions and in one-to-one encounters they are, as they were designed to be, superior to the individual tank. Their presence will *have* to be taken into account wherever tanks move in the future. Their lethality will dictate some of the terms of tank design and will require some revision of the techniques of armor employment. But with that much granted, the modern family of antitank weapons will do no more to eliminate the need for tanks than machineguns did to do away with infantrymen.

Indeed, that error has been made before. In 1937, the French Ministry of War wrote off the tank with these words, “At the present time, the antitank weapon confronts the tank as, during the last war, the machinegun confronted the infantry.” That estimate, which echoes so much of contemporary opinion, was tragically erroneous, as the Germans demonstrated in 1940. We should certainly not put ourselves in the way of reestablishing its falseness. If we do, we will be ignoring not only the lesson of the past, but also the example of those with the most recent experience in tank-antitank opposition.

Dr. James Schlesinger, former Secretary of Defense offered the public a beneficial insight into the aftermath of the October 1973 Arab/Israeli War, which is itself so often used to document arguments against the tank. Addressing the problem on NBC’s “Today” show, Dr. Schlesinger pointed to the eager reacquisition of replacement tanks in great numbers by both sides of the Mideast belligerency as a demonstration that those most affected by the supposedly transcendent power of advanced tank killers still



count heavily on the value of their armored forces. That point should not surprise professional soldiers; yet, it was surely worth making before a large audience in this country where the debate proceeds un-leavened by recent direct experience.

The final demonstration of the tank’s continuing usefulness is an examination of the reverse case: *What would be the nature of modern combat without the tank? Can any other weapon replace the tank in exploitation, pursuit or screening missions?* Absence of the tank’s protected mobile firepower from the contemporary battlefield suggests a startling image. In the presence of masses of artillery, high performance aircraft, electronic sensors, special weapons, and numerous antiaircraft and antivehicle weapons, the possibility of stalemate grows. Assuming that APC’s will be equally stymied by AT weapons and that airborne troop movements will be extremely risky, the conflict shapes up as an updated World War I. With maneuver thus restrained and decision thus deferred, the stage is set for the great anticlimax . . . the reinvention of the tank.

That scenario, of course, falls somewhere between unlikelihood and absurdity, but it has to be dealt with by serious critics of the tank. It is the logical extension of their proposition. Realistically, the armies of the future will use the tank. Its degree of dominance in land warfare may well diminish, but the singular advantages of the tank have not yet been replaced. Commanders will still find its speed on the ground, its psychological effect and its shielded combat power critical to maneuver and, in many cases, decisive. Confronting improved counterweapons, armor leaders will work harder for surprise; move and attack more at night; use more artillery, air strikes, and smoke; make more of their initial contacts with infantry; employ better antiaircraft weapons — and accept higher casualties. But they *will* use the tank, though it probably will not be the massively armored, increasingly complex tank on so many drawing boards in this country today.



That introduces the second point — *reaction to the antitank threat as reflected in our plans for future tank design* — and that point is really more critical and plainly more controversial. It is my view that solutions to the problem have been, generally, incorrect and that overemphasis on the tank-to-tank duel and *possibilities* of sophistication on a tank-by-tank basis have beguiled us into proposing tanks that *are* prime for extinction in future combat.

Perhaps the size of the vehicle and our vast technical capabilities are irresistible temptations. Certainly our great stress on the actually rare two-weapon engagement can be misleading. But whatever the causes, our research produces some amazing features for our future tanks. We can turn out tanks that fire guided missiles, tanks that find ranges to targets in terms of inches, tanks that load themselves and shoot on the move, tanks that squat and stretch on their suspensions, tanks with airtight interiors or almost anything else that seems useful. While some of these developments are worthwhile, what needs to be examined more carefully are the questions of the individual tank's combat role (how much sophistication is really required of each vehicle), and the true costs of owning a fleet of "super-tanks." Most likely, then, the problem consists of balancing quantity with quality and excellence with expendability.

Essentially the tank is a weapon as a rifle is a weapon. Much can be done with it and to it. It can be refined to science-fiction levels if we can and wish to pay the price. But above all else, it is still a weapon subject to risk and loss; subject to breakdowns, mud and crew failures even in its most simple configurations; and demanding operation and maintenance by combat soldiers in difficult conditions.

To remain effective in Armor's role of bringing rapid mobility and deep striking power to the battlefield, the tank must adapt to its new situation. It will have to do certain things very well, but it should not be expected to totally dominate its surroundings as a self-sufficient unit. Individual tanks are the small change of combat; they must be produced and deployed in great numbers, especially in the presence of better counterweapons, and they will have to rely to a large extent on mutual support for their security. Losses must be expected and bearable, both numerically and financially. Reliability and simplicity demand recognition as qualities as valuable as sophistication and complexity in the field. All of which is to say that our standard tank should be simpler than recent developments have suggested that it could be, and it should not be much more expensive than existent tanks are. It is probably no more desirable to arm a tank platoon with five \$2-million supertanks than it is to equip an infantry platoon with 30-odd expensive sniper rifles.

Again a historical illustration is helpful. The superior medium tank of World War II, the Soviet *T-34*, exemplified the effectiveness of modernity and simplicity in proper combination. Rugged and powerful, it had the best basic features available in its day and very little else. Its combat superiority forced the Germans to design new tanks in efforts to overcome the *T-34* and, in abstract and individual comparisons, several models of their *Mark V* and *VI* series bettered the *T-34*. But on the field of battle they never did; the Russian advantages of design and numbers were too great to be offset by incremental gains made in design by their enemies. Notwithstanding the special circumstances of that period and in spite of the years that have passed, Mellen-thin's sad observation retains importance for us today: "The Russian tank designers understand their job thoroughly; they cut out the refinements and concentrate on essentials — gun power, armor, and cross-country performance." We should do the same.

None of this should be taken as advocacy for adoption of an inferior tank or for forfeiture of advantages that superior technology offers. There is surely a place for missiles, lasers, and stabilizers in our tank forces, but in view of their true utility and the penalties that their expense exacts against the number of tanks we can employ, we must ask whether these items belong in every turret. Depending on equipment and mission, threat and necessity, they should be present within battalions or com-

panies in limited numbers or concentrated in special purpose units. Seen from one side, this implies undesirable complexities and disuniformities. But to others it may suggest greater, more efficient use of capacities for flexibility and a more economical solution to procurement, thereby reducing per-unit cost and permitting the purchase of a greater number of tanks with a set appropriation.

What sort of main battle tank would this relatively austere approach to tank development produce? Hopefully, the result would be a tough, fast and comparatively sophisticated weapon ideally suited for the armor role in the more hostile environment created by the new array of antitank weapons. Generally, it should be smaller — closer in size to the Soviet *T-62* or German *Leopard* — than to the U.S. *M-60*-series. It should mount a single purpose, high-velocity cannon directed with the aid of an optical range finder and capable of night firing through passive night vision sights. It should be fast and maneuverable, and as easy to maintain as our technicians can make it. Its armor should turn fragments and small shot, and its hull and track should resist antipersonnel mines. We will have to recognize, however, that currently used materials cannot be expected to stand up to the large explosive charges of antitank missiles and that, barring the development of a new form of armor, the tank will have to depend primarily on suppressive fires and its own speed and small size for defense. Finally, our standard tank should be capable of mass production for large scale mobilization.

Our next tank should not, in other words, sacrifice any of the true necessities and, in its design, it should represent an evolutionary advance rather than a revolutionary jump. Stabilizers and automatic loaders would be nice to have if they offer a clear tactical advantage and mechanical simplicity without overloading the tank. Ease of modification and receptacles for add-on equipment like guided missiles should be planned. Features like the counter-rotating driver's cupola of the *MBT-70* type should be ruled out on grounds of cost and complexity.

Such a weapon would be neither cheap nor primitive, but it should be affordable and effective when employed in force — as tanks certainly will be in the future. If such a vehicle lacks the ability to cruise the battlefield in magnificent disdain of all but rival armor, it is best to recall that tanks have never enjoyed that kind of immunity except in the most naive of popular conceptions. If it is vulnerable to antitank fires, it is no more so than a larger, more

complex model and it is also capable of dealing with that threat if it is cleverly (i.e. properly) employed. If its main gun lacks pinpoint accuracy at 4,000 meters, that is a quality which will rarely be demanded of fighting tanks. The virtues of such a vehicle would offset many of its faults. Its high rate of fire, accuracy at combat ranges, presence in great quantities, superior simplicity and acceptable expendability must all be considered favorably.

As for the fruits of research, they should be continually cultivated, improved, and simplified. Where they can be obtained at reasonable cost and without imposing reductions on our tank fleet overall, they should be adopted as modifications. In the meantime, when their usefulness is established, they can be added to our armored forces in a fashion we have not much favored in the past: they can be issued on a number-per-platoon, -company, or -battalion basis. Exceptionally high cost battalions or brigades might also be equipped with supertanks and employed in critical roles or places. Cavalry units which rely on superior firepower and mobility certainly should have them. In all cases, however, a standard chasis should be used for simplicity's sake and for the avoidance of signatures (such as the *Sheridan* now presents in our Cavalry units.)

We would be foolish to abandon the tank altogether; realistically there is little danger that we will do so. We would be wise, though, to shape our plans for a new standard tank to a more reasonable and durable model. If we continue to design and propose the large costly tanks that have appeared as prototypes, we expose ourselves to the risks of either retaining an outmoded tank fleet for lack of a reasonable replacement or procuring a small number of refined and expensive vehicles which will possess individual advantages likely to be outweighed by collective weakness.



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FORWARD HO!

THE DELTA TROOP MYTH

In the first "Professional Thought" published by *ARMOR*, the specter of a Delta Troop Myth was raised by Brigadier General Hugh J. Bartley. He beseeched all Armor officers to accept the rude fact that the armored cavalry squadron commander is merely a babysitter for the Air Cavalry Troop, and that the squadron's Delta Troop would be employed by the division commander in the field and in combat. General Bartley proclaims that it is a myth to believe that the division commander would routinely, or even often, permit one of his lieutenant colonels to determine and supervise the tactical employment of such a large and valuable part of the division's aviation assets.

My experience dictates that this so-called myth is, in fact, reality and that we all would be remiss in thinking otherwise.

A quick review of armor doctrine reveals that Delta Troop is both an organic unit within the Cavalry Squadron and an integral part of the squadron's tactical employment. TOE 17-105H, Armored Cavalry Squadron for Armored and Mechanized Divisions, lists the Air Cavalry Troop as an organic squadron unit. Also, it states that the squadron has the capability to perform aerial reconnaissance and security missions. Obviously, this means that the cavalry squadron will employ the air cavalry troop, since there are no other aircraft in the squadron. FM 17-36, Armored Cavalry, which provides doctrinal guidance for employment of the divisional armored cavalry squadron, employs the air cavalry troop in every facet of the squadron's operations. This is the doctrinal concept which General Bartley has proclaimed to be a myth. Is this true? If it is, then we must change our doctrine and TOE 17-105H. If it is not true, then long live the myth.

The divisional cavalry squadron has traditionally been given missions which require it to conduct operations on all extremities of the division area.

Advance guard, flank and rear guard, and economy of force missions are common occurrences for the cavalry squadron. When the division is foot mobile, the cavalry squadron can easily perform its mission through the use of ground vehicles. In this case, the cavalry possesses a greater mobility capability than the force for which it must secure and provide reconnaissance. On the other hand, when the division is mounted in tanks and personnel carriers, the cavalry squadron could hardly be expected to have the required mobility by employing only ground vehicles. In order for the cavalry to perform its assigned missions for armored and mechanized forces, the squadron should possess a favorable mobility differential. This capability can only be attained in armored and mechanized divisions through the employment of aircraft. This capability is provided by Delta Troop, without which the cavalry squadron would be relegated to the speed and maneuverability of the remainder of the division.

If the Air Cavalry Troop is employed as a tactical unit within the division, the cavalry squadron headquarters is better equipped to conduct its operation than other division headquarters units. The squadron personnel are trained in air cavalry operations and the squadron possesses a greater communication capability than any other headquarters except the division headquarters. If the assets of Delta Troop are fragmented and employed separately, the division will lose a potent force, for the air cavalry troop is designed to operate as a unit. What will the troop's platoon do if its *UH-1* carriers are employed elsewhere? How will the troop conduct aerial operations if its *AH-1G* aerial fire support vehicles are given separate missions? Delta Troop, the cavalry squadron and the division will all be less effective if the air cavalry troop is not employed as an integral part of the armored cavalry squadron.

What has prompted General Bartley to proclaim our cavalry doctrine to be a myth? Misconception and lack of aviation utilization experience are presumably at fault. The air cavalry craft are not aviation assets. They are intended for aerial combat. Therefore, Delta Troop cannot be a large part of the division command's aviation assets. In addition to this general terminology misconception, there appears to be lack of perception of the aircraft in question. General Bartley stated that the troop had

17 utility aircraft. To make this assumption, he had to consider the nine *AH-1G* aerial fire support vehicles as utility aircraft. It is possible to conceive the troop's eight *UH-1H* aircraft to be utility vehicles. But this is also not true. Five of these are personnel carriers for the troop's infantry platoon. Would you call an *M-113* a utility vehicle? It is unfortunate that aerial vehicles assigned to Delta Troop have the same nomenclatures as aircraft employed in the general aviation role.

In addition to the lack of understanding concerning air cavalry vehicles and employment, the majority of our division commanders and divisional staff officers began their aviation employment experience during the Vietnam era. During the war in Vietnam, in addition to organic divisional aircraft, each American unit was supported by an enormous amount of aircraft from the First Aviation Brigade. This condition propagated an excessive use of aircraft. Now that we have returned from Vietnam, we have little nondivisional aviation support available. The division must operate within the limits of

ARMORED/MECHANIZED DIVISION AIRCRAFT				
	LOH	UH	AH	Total
AVN CO	6	4		10
BDE HQS	12			12
DIV ARTY	14			14
SPT CMD		2		2
CAV SQDN	10	8	8	27
				65

its organic assets. Considering previous experience, it is little wonder that the armored and mechanized divisions want to utilize more aviation assets than are assigned.

What can be done to correct the imbalance of air cavalry troop doctrine and correct the perceived employment misconception? Short of providing the division with additional aircraft, there are many things that could rectify this depreciatory situation. All Army schools should stress the difference between the aviation assets of the division and the aerial combat craft of the Air Cavalry Troop. The Armor, Aviation, and Infantry Schools, together with the Command and General Staff College, should be the forefront of this effort. Until the aircraft of the scout, weapons, and rifle platoons of Delta Troop are no longer considered to be aviation assets, the myth, as perceived by General Bartley, will indeed be actual division employment doctrine.

In addition to school doctrine and training, action is required by all of us who perceive that the armored cavalry squadron commander should employ the squadron's air cavalry troop. We must educate all commanders and staff officers by our writing, speaking, and employment example. The ultimate insurance of proper Delta Troop employment lies with the armored cavalry squadron commander. He must include air cavalry employment in all of his units' training. Squadron operation plans must always include full utilization of the air cavalry troop. The squadron commander should take every opportunity to educate the division commander and his staff that there are no aviation assets within the cavalry squadron, and that the Air Cavalry Troop is an indispensable part of the squadron's capability to accomplish its assigned reconnaissance and security missions.

— Lieutenant Colonel William P. Gillette
Instructor, AFSC

Crisis in Ground Mobility: End or Continuation?

The assumption that man is a rational being appears somewhat irrational, and the state of the world in 1976 is testimony to the accuracy of that observation.

Even such a pedestrian activity of the Space Age as automotive ground locomotion is no exception.

At a prestigious "Mobility Symposium" organized in 1963 by the Allison Division of General Motors Corporation for a select group of Armed Forces representatives, this writer spoke on a crisis in

ground mobility. At that time, it was my hope to contribute to the prevention of the crisis that an official publication of the Aerospace Industries of America (AIA) foretold in the 8th Aerospace Technical Forecast for the period 1962-1972.

The prophecy by AIA is still valid and worth recalling, to wit: "Ground mobility will continue to be a high-priority requirement for future military operations. However, the approach to mobility in the next 10 years will be a random one, as it has been for the past 5 years, and the net result will tend to minimize actual increases in mobility during the next decade." What happened after 1962 confirmed these sad expectations?

Unfinished or discontinued mobility programs and failures were not counterbalanced by significant new developments. On the contrary, only cancellations of unsuccessful programs were reported. Among them were the Mobility Environmental Research Study (MERS) project, Cornell University's off-road mobility research, the MBT-70/XM-803 tank program, and the armored scout vehicle.

These R&D failures, which represent millions of dollars of wasted economic resources and the loss of more than a decade of precious time, are undoubtedly augmented by the failures of lesser known projects. The so-called Army Materiel Command's (AMC) Mobility Program, for instance, appears to lie in that category, although details of the results of the program are lacking. This multimillion-dollar package, which included the mapping of large areas, soil indexing, and a myriad of super-computer inputs, allegedly helped the Army and other services to replace special military vehicles with commercial ones. Although well publicized in the "Wheels" study, the extent to which the allegation of success is true is totally uncertain because even some of the coauthors of the report of this mammoth undertaking stated publicly in 1974 that, "The model (program) is incomplete in some aspects, lacks reliability in others, and has not yet been fully validated in some parts, or as a whole."

The most eloquent expression of the state of affairs, perhaps, is the recent indication that the Army is apparently relinquishing its leadership in the research and development of ground mobility by announcing a Request for Proposal (RFP) which seeks an outside organization to run the R&D show for Detroit.

In contrast to the marginal successes and more

numerous failures of the Army's efforts in land mobility, the development and production of the Lunar Rover Vehicle (LRV) stands out as what appears to be an unprecedented achievement. But in fact, the creation of the LRV was the normal outcome of the application of existing methods. Parametric analyses of various terrain-vehicle systems, based on quantitative definitions of the environment and the mission, within the rules of applied mechanics and engineering, led to the optimum design and performance of the LRV, with a minimal error.

The methodology used by NASA and the aerospace industries was first publicized at the First International Conference on Terrain Vehicle Systems held in 1961 in Torino, Italy. This methodology for research in ground mobility was later refined in the laboratories of General Motors under contracts let by NASA. This led to the publication of a textbook on the subject by the University of Michigan Press in 1969. The text has since been translated into foreign languages.

Although the draft of the textbook was originally written under Army contract, the book has not been used, nor meaningfully quoted, in the publication of the Army's research reports on ground mobility. This neglect, if not rejection, of a considerable body of knowledge, has been going on for approximately 20 years. To date, the Army has been unable to resolve the problem of faulty research and development, although it has been acutely aware of its existence since approximately 1956.

The causes of the miscarriage of research have repeatedly been brought to the attention of those concerned. Presentations, discussions, and comments were heard at the Allison Symposium in 1963; again, in 1964, at the Society of Automotive Engineers Congress; and later, a criticism with international echoes reverberated at the Thompson Ramo Woolridge-International Society for Terrain Vehicle Systems Symposium in 1970. Recently, an article appeared on the subject in *National Defense Review*. At other times, literally dozens of reports, briefs, and memoranda covered the same ground.

Undoubtedly the Army has decided to take long overdue corrective action by seeking outside managerial skills for its R&D efforts related to ground mobility. Hence, the moment appears to be ripe for correcting past mistakes. To this end, a summary of causes, which were blamed in the past for

the present predicament, may be useful.

The Army has for far too long (25 years) permitted the development of two naturally incompatible methodologies, under the guise of "free competition." The competition has not been free because, following Gresham's Law, poor money has pushed the good money out of the market.

The Army never supported industry in a long-range ground mobility research problem, as NASA did for a decade. As a result, automotive and affiliated industries have never been interested enough or equipped well enough to carry out a full-fledged study. As a consequence, any involvement by industry has entailed much cost and lag time which could not be afforded.

Contractual research arrangements with universities and "think tanks" were not provided with the overall intellectual guidance needed because of their lack of intimate professionalism in an *ad hoc* treatment of a problem. The result was a hodge-podge of projects that do not fit any existing school of thought or distinguishable patterns that will lead to practical results.

The advisory bodies of the Army have failed to issue timely warnings and guidelines to the technicians. As a result, Parkinson's Law has taken over with the proliferation of bureaucratic decisions, unjustified equipment procurement, and bigger and bigger computer programs.

The vested interests of administration overshadowed the rationale of research, creating a situation in which even those without proper research credentials were allowed to reject what they did not like, thereby confusing the real issues. Their scapegoat has been everything which they have not done; their motto; eternal promise of better, ideal solutions. The resultant product is research that has no officially recognized tradition, no peers. It is disjointed and antipragmatic.

The action by the Army to remedy this situation, as hopefully seen in the announcement of an RFP, would be enormously helped — in this writer's opinion — if the following steps are taken:

- Eliminate the overlapping, duplicate organizations that still exist in the Army.
- Concentrate the ground mobility R&D effort in the Detroit area where it can be conducted in the closest cooperation with the automotive industries.
- Screen existing methodologies and know-how to cull out the unessential, and retain and consolidate

that which has an immediate application to the solution of urgent problems at hand.

- Establish operations research analyses for the purpose of mapping long-range research programs that will lead to improvement, refinement, and extension of the existing state of the art, as well as to second-generation methodology.

- Establish, jointly with the user, patterns for quantitative formulation of mission requirements and environmental measurements to prevent the recurrence of the present ambiguities and arbitrary "indices" that have no physical meaning.

- Approach problems pragmatically as they emerge in their hierarchy of importance. Forget grand generalizations until "subroutines" are validated.

- Remember that over-complexity of a solution does not necessarily guarantee better results.

- Do not procure laboratory equipment before there is a plan for its full amortization.

- Remember that "breakthroughs" in automotive engineering are not very probable, if at all. Concentrate on evolution rather than revolution.

- Bear in mind that in ground mobility, nothing is black and white. Statistical averages and preferences are the only clues for making decisions. This, in itself, requires a complete overhaul of the approach to parametric analyses of terrain-vehicle systems.

- Establish a well-planned educational activity and produce didactic material which will help to inform and teach, and which will expose the Army's work to the advice and consent of the engineering world at large.

- Assist educational institutions in producing a new generation of engineers and scientists who are students of mobility and capable of taking over and continuing research in the future.

- Cultivate professional heritage and peer systems which, like public opinion, are the only regulatory forces for preventing excesses and chaos.

If these remedies do not help end the crisis in ground mobility, what else will?

Dr. M. G. Bekker, an engineer, scientist, and author holds two honorary doctorate degrees for his outstanding contribution to transportation engineering. A pioneer in the design of all-terrain vehicles, he was a guiding force in development of the Lunar Rover Vehicle used during Apollo moon missions.

short! over! lost! OR...TARGET ⊕

LTC JOHN C. BAHNSEN

GAINING THE EDGE

You don't need a computer to conclude that we will fight the next war outnumbered. The enemy will have more men, weapons, and equipment on the battlefield than we will initially have. This is especially true of the armor situation. The U.S. Army can expect to have no more than 3,000 tanks facing up to three times that number.

So how do we gain the edge, that extra something necessary for us to win? Tank technology and reasonable costs will let us match the enemy's tanks in design and capability, but any great leap ahead of what other armies can produce will not be allowed. But we can increase our odds for success by improving the abilities of our tank crews, by selecting and training a breed of "Hot Shots."

Traditional methods of selecting, training, and managing the men of our tank corps will not suffice. We must select crewmen based upon predictors of performance. We must arrange for less than competent tankers to enter some other MOS. We must keep crews together longer. And we need an Armor Training Command to manage the overall Armor program of training.

Selection

Today, any male enlisting in the Army can choose Armor if he has a minimum 20/20 vision, is not red/green color blind, passes the physical examination, has a "picket fence" profile, and achieves a score of 90 points on the Combat Aptitude (CA) portion of the Army Classification Battery (ACB).

That's it. Those are the requirements. Nothing is said about mechanical aptitude, strength, psychological stability, height, weight — anything.

And one reason nothing else is required is because we don't know what makes a good tanker. But we had better damn well find out — if our tanks are to be manned by the best possible crews.

Any Armor leader can easily recall the standout crews in his unit. Their tanks were always in good mechanical condition. They qualified easily on the Tank Crew Qualification Course (TCQC), shooting quickly and accurately. What made them better than other crews in the same unit?

It's time we spent some money to determine the predictors of performance for our "Hot Shots." Some preliminary data are being gathered at Fort Hood and helpful information will result from that effort. But we must have a more sophisticated research base for our crew selection process. Examples: *Does a better gunner wear glasses or not? Does a GT score of 120 predict a more effective tank commander than does a score of 95? What's the optimum range of GT scores for "Hot Shots?" What about MOS scores?* If these traits don't correlate to gunnery, which ones do? There must be some factors from which to select men whose probability for acceptable performance is high.

Let's look at an example. A group of soldiers in advanced individual training (AIT), receiving the same preliminary training, would be required to shoot the main gun at three stationary and two moving targets under identical conditions. Performance

would be correlated with items such as vision, physical fitness, general training aptitude area (GT) score, and other traits until a profile of significant predictors surfaces. With enough replications to provide statistically significant results, we could have a firm basis for selecting the best men to be our tankers.

Similar research must be done on all the factors necessary for individual and crew performance. One of the critical tasks for a tank commander is target acquisition. What traits can we identify in those who see targets quickly under battlefield conditions? The *Sheridan* loader's duties are critical to good gunnery. How do we select men who will be successful at these duties?

There are a number of ways such data could be derived. And we should spend the money to do so. Let's hypothesize that there is a functional relationship between gunnery performance and intelligence scores. Our yardstick for measuring gunnery performance could be the time it takes to detect a target (Td) on a TCQC run. A statistical analysis of test data might yield a curve of the following type:



Once this relationship has been established, a performance predictor for GT scores could easily be established. Time of detection standards for the modern battlefield must be agreed upon beforehand, say 8 seconds is the desired limit.

That would indicate that potential tankers would be selected only from those with at least 95 points on the GT test.

We should apply these criteria for selection early. Preliminary standards must be met before a candidate is even considered for Armor. During BCT, the Armor hopefuls should be required to demonstrate ability to meet the standards, say, of a psycho-motor skill test. Further weeding out should occur during AIT, subjecting potential tankers to tests — graduating those who qualify and finding

other jobs for those who fail. Once we have a qualified, motivated tanker, we then begin molding the best possible tank crew.

Tank Commanders

Further, we should consider lateral selection of tank commanders similar to the way we select warrant officer candidates for helicopter training. Based on the right criteria, we might recruit for tank commander qualification both within the Army and from civilian life. We could send selected recruits to a tank commander's school, graduating the qualified tank commander in the grade E-5 and a follow-on, 24-month promotion to E-6 based on performance. The "Tank Commander Candidate School" could be our answer to getting the best leader in the saddle!

Retention

Once we select only those with potential for becoming a "Hot Shot," the quality of our crews will doubtless improve. But what about those already in the system who don't meet our expectations? We must arrange to get them into other jobs and out of our tank crews.

Stringent standards must be set for each EPMS skill level. Tankers who can't progress should be allowed to change MOS. This change should occur before Skill Level Two. Only the best performers should become gunners and tank commanders.

Platoon Leaders

Every tank platoon is commanded by a lieutenant. If we plan to upgrade our crews by selection based on predictors of performance, we should also have criteria for our lieutenants. Again, lieutenants choose Armor: Armor doesn't choose its lieutenants. This must change.

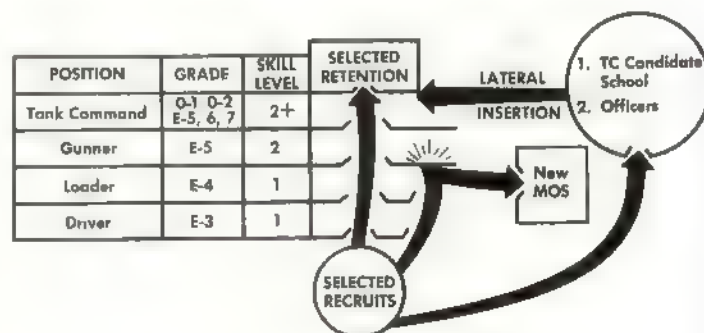


Figure 1. Crew selection process

Qualities of a good platoon leader must be determined and used to form the basis for selection. Certainly those factors required of a tank commander should also be applied to the lieutenant. He must lead by example; therefore, he must be able to quickly learn his duties and he must possess the same traits required of our enlisted "Hot Shots." If he can't cut it, he needs to be helped in finding another line of work. Only the best must be allowed to command our platoons.

Stabilization

A recent survey of a tank battalion at Fort Hood showed that only 17 percent of the crews had been together more than 6 months. That fact is not unusual. Personnel turbulence is so bad we don't really have crew training — it's more like individual training with hasty assembly for the gunnery season. For years we blamed this on the Vietnam War. We are now 3 years into a peacetime Army, yet the problem still exists — it's time to correct the problem.

One indication of the crew stabilization problem is the way one battalion viewed itself. The officers were asked how long their crews had been assigned to the same tank. They said approximately 9-11 months. But the crew members responded 3-5 months. Obviously, the officers were unaware of the problem. As a note of interest, the respondents expressed the opinion that crews should stay together approximately 8 months before full proficiency as a crew could be achieved.

DURATION OF CREW ASSIGNMENT		
Crew Psn	Mean (Months)	
	Officer Perception	EM Perception
Tank Commander	11.5	5.00
Gunner	8.9	4.36
Driver	10.0	3.45
Loader	8.8	3.31

The U.S. Army *must* stabilize crews. Those four men in the tank must develop a coordinated team spirit as well as constantly improve individual skills. This cannot be done unless they work together over a long period of time. New tankers will always be entering the system, and experienced tankers will be leaving the service or be promoted. Even though there is some dissatisfaction with results, one experi-

ment with stable crews is showing promise. Veteran tank commanders and gunners are arriving at Fort Knox to work with loaders and drivers from AIT. After a short training session as a crew, the 4-man package is sent to Europe for assignment to an M-60A2 tank.

Once we place together a good crew, we should make all efforts to keep them together. The crew should be rotated as an entity from battalion to battalion, from Europe to CONUS to wherever a crew of "Hot Shots" is needed. Perhaps the stabilization could even extend to platoons. Surely computer technology can handle the personnel management side of this suggestion. I would submit that those commanders that don't want intact crews provided identify themselves as part of the crew stabilization problem, albeit there are valid reasons for splitting crews up once on station.

Yes, commanders will bitch about their prerogative for assigning their people as they see fit. But a control over the quality of our tank crews is more important than the commander's prerogatives. If we can maintain crew stability for our "Hot Shots" of more than 1 year, we will have come a long way in increasing the ability of our limited number of tank crews.

Training

Armor training is currently a sham. The reasons are many: excess administrative requirements, lack of training areas, insufficient numbers and inadequate quality of crewmen, and pretense among our leaders. We fool ourselves into thinking we are combat ready. One battalion recently qualified 100 percent of its crews on TCQC. But 2 months later, an inspector could not find one person among five "qualified" crews who knew how to boresight the main gun. Also, the commander admitted he had not used IR during night firing because the equipment was inoperable. Anyone can qualify if he's allowed to make his own rules.

Since we are an army of statistics, at least we should have the courage to report our numbers with attendant modifiers so we don't delude ourselves. We must set standards to judge our crews. If deviations are necessary due to local conditions, we should report those deviations.

Much work is being done to set those standards. For the individual tanker, the forthcoming *Soldier's Manual* will delineate what he should be able to do and how well he should be able to do it. His performance requirements will be in black and white for

him and his commander to judge. The Army Training and Evaluation Program (ARTEP) will state the desired performance for units. Perhaps, with these documents as guidelines, we will have better training.

Even then, armor training must be a continuing program. Once-a-year gunnery is inadequate even if we select crewmen by predictor of performance, and stabilize crews. Tankers must maintain their vehicles, learn tactical maneuvers, and practice related soldier skills, but above all — tankers must be able to hit targets. That means gunnery practice with live ammunition and frequent use of simulative devices. That's the only way we will win that first battle of the next war.

As an incentive to the selected "Hot Shot," the title of *ACE* crew might be a goal to strive for. What is an *ACE* crew? As a starting point, let's define it this way: An *ACE* tank crew can acquire and hit 5 tank targets within 25 seconds, all targets appearing at once at ranges from 500 to 3,000 meters. Perhaps that standard needs to be refined to include conditions. (Combat kills of 10 enemy tanks could also be a goal.) Perhaps some other criteria are needed. But a well-defined performance objective stressing time and accuracy should be met before awarding the designation of *ACE*.

Such a designation would instill pride within our tankers and permit us to man our crews with really proficient men. We must have *ACE* crews in our tanks when the balloon goes up.

Armor Training Command

Armor training suffers because there is no focal point, no center for overseeing the attempts at setting standards for crew selection, for training, for personnel management. The Armor School is responsible for establishing doctrine and disseminating it through resident instruction and Army-wide training support. The Armor Training Center produces soldiers with MOS 11E, but has no control over where the graduate is assigned. MILPERCEN operates as a flesh peddler, matching bodies against requests and levies, but has no control over final assignment of the tanker.

The entire program for Armor training must be interpreted and supervised by a central agency. An Armor Training Command (ATC) should be established using many of the fine aspects of the Strategic Air Command (SAC). SAC has been successful in gaining the best performance from highly selected personnel, awarding special recognition and spot promotions for outstanding work. The emphasis is

on a highly trained and combat ready force. A similar emphasis is needed for Armor training.

The Armor Training Command would maintain the data for predictors of performance, select, retain, and eliminate as necessary from the available pool of tankers, and manage a computerized assignment and stabilization schedule for tank crews worldwide. The ATC would set the standards for individual and crew performance, in conjunction with the service schools and the proponents of *Soldier's Manual*, ARTEP, and training literature. The ATC would inspect and evaluate training of Armor units worldwide. The Armor Training Command would operate the Tank Commander's Candidate Course.

Dramatic Changes

Current Armor training will not permit us to have the best possible crews in our tanks when the first battle of the next war is fought. If we are to be ready with *ACE* crews manned by "Hot Shots," our methods of selecting tankers, training them, and keeping them together as crews must change dramatically.

We must:

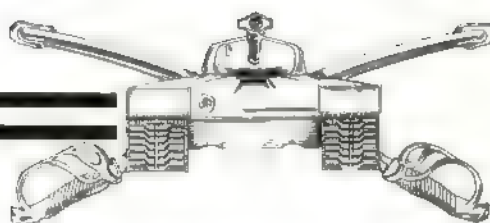
- Determine predictors of performance for "Hot Shots," and use those predictors to select our crews.
- Train crews to strict individual and collective standards.
- Eliminate ineffective tankers.
- Insist on honest appraisals of our training.
- Devise a year-round program for improving Armor skills, especially gunnery.
- Select and train tank commanders for lateral insertion into the tanker MOS.
- Establish an Armor Training Command to supervise the overall effort.

Improving our tank crews is the only way to gain the edge.



LTC JOHN C. BAHNSEN was commissioned from the U.S. Military Academy in 1956 and has commanded armor units at platoon, company, and battalion levels in Europe. In Vietnam, he commanded an armed helicopter platoon, an air cavalry troop, and an armored cavalry squadron. Colonel Bahnsen attended the Army War College in 1972 and is currently the Chief of Collective Training Branch at TRADOC Headquarters.

OPD - ARMOR



Some time ago Armor Branch published in the Armor Newsletter the designation and location of all Armor units. Although several minor changes have taken place, the Newsletter is still reasonably accurate. For those who have either lost theirs or never received one, the following listing is provided. It is recommended that this information be considered prior to filling out the preference statement. If an Armor assignment is desired, the likelihood of getting it is certainly greater at those locations which have a high density of Armor units.

ARMORED CAVALRY REGIMENTS

UNIT	LOCATION
1st Sqdn, 3d Armored Cav Regt	Ft. Bliss, TX
2d Sqdn, 3d Armored Cav Regt	Ft. Bliss, TX
3d Sqdn, 3d Armored Cav Regt	Ft. Bliss, TX
1st Sqdn, 2d Armored Cav Regt	Germany
2d Sqdn, 2d Armored Cav Regt	Germany
3d Sqdn, 2d Armored Cav Regt	Germany
1st Sqdn, 11th Armored Cav Regt	Germany
2d Sqdn, 11th Armored Cav Regt	Germany
3d Sqdn, 11th Armored Cav Regt	Germany
1st Sqdn, 1st Cav, 1st Armored Div	Germany
1st Bn, 13th Armor, 1st Armored Div	Germany
1st Bn, 35th Armor, 1st Armored Div	Germany
3d Bn, 35th Armor, 1st Armored Div	Germany
1st Bn, 37th Armor, 1st Armored Div	Germany
2d Bn, 37th Armor, 1st Armored Div	Germany
2d Bn, 81st Armor, 1st Armored Div	Germany
3d Bn, 63d Armor, 1st Inf Div	Germany
4th Bn, 73d Armor, 1st Inf Div	Germany
3d Sqdn, 12th Cav, 3d Armored Div	Germany
1st Bn, 32d Armor, 3d Armored Div	Germany
2d Bn, 32d Armor, 3d Armored Div	Germany
3d Bn, 32d Armor, 3d Armored Div	Germany
1st Bn, 33d Armor, 3d Armored Div	Germany
2d Bn, 33d Armor, 3d Armored Div	Germany
3d Bn, 33d Armor, 3d Armored Div	Germany
3d Sqdn, 7th Cav, 3d Inf Div	Germany
1st Bn, 64th Armor, 3d Inf Div	Germany
2d Bn, 64th Armor, 3d Inf Div	Germany
3d Bn, 64th Armor, 3d Inf Div	Germany
4th Bn, 64th Armor, 3d Inf Div	Germany
3d Sqdn, 8th Cav, 8th Inf Div	Germany
1st Bn, 68th Armor, 8th Inf Div	Germany

2d Bn, 68th Armor, 8th Inf Div	Germany
3d Bn, 68th Armor, 8th Inf Div	Germany
5th Bn, 68th Armor, 8th Inf Div	Germany
4th Bn, 69th Armor, 8th Inf Div	Germany
4th Sqdn, 7th Cav, 2d Inf Div	Korea
1st Bn, 72d Armor, 2d Inf Div	Korea
3d Sqdn, 4th Cav (Air), 25th Inf Div	Hawaii
2d Bn, 69th Armor, 197th Bde	Ft. Benning, GA
1st Sqdn, 17th Cav (Air), 82d Airborne Div	Ft. Bragg, NC
4th Bn, 68th Armor, 82d Airborne Div	Ft. Bragg, NC
2d Sqdn, 17th Cav (Air),	
101st Airborne Div	Ft. Campbell, KY
1st Sqdn, 10th Cav, 4th Mech Div	Ft. Carson, CO
6th Bn, 32d Armor, 4th Mech Div	Ft. Carson, CO
2d Bn, 34th Armor, 4th Mech Div	Ft. Carson, CO
*4th Bn, 40th Armor, 4th Mech Div	Ft. Carson, CO
1st Bn, 70th Armor, 4th Mech Div	Ft. Carson, CO
1st Bn, 77th Armor, 4th Mech Div	Ft. Carson, CO
4th Sqdn, 9th Cav (Air),	
6th Air Cav Cbt Bde	Ft. Hood, TX
7th Sqdn, 17th Cav (Atk),	
6th Air Cav Cbt Bde	Ft. Hood, TX
1st Sqdn, 9th Cav, 1st Cav Div	Ft. Hood, TX
1st Bn, 8th Cav, 1st Cav Div	Ft. Hood, TX
1st Bn, 7th Cav, 1st Cav Div	Ft. Hood, TX
2d Bn, 5th Cav, 1st Cav Div	Ft. Hood, TX
2d Bn, 8th Cav, 1st Cav Div	Ft. Hood, TX
2d Sqdn, 1st Cav, 2d Armored Div	Ft. Hood, TX
1st Bn, 66th Armor, 2d Armored Div	Ft. Hood, TX
2d Bn, 66th Armor, 2d Armored Div	Ft. Hood, TX
1st Bn, 67th Armor, 2d Armored Div	Ft. Hood, TX
2d Bn, 67th Armor, 2d Armored Div	Ft. Hood, TX
3d Bn, 67th Armor, 2d Armored Div	Ft. Hood, TX
2d Sqdn, 6th Cav, USAARMS	Ft. Knox, KY
7th Sqdn, 1st Cav (Air), 194th Bde	Ft. Knox, KY
*5th Bn, 33d Armor, 194th Bde	Ft. Knox, KY
4th Bn, 37th Armor, 194th Bde	Ft. Knox, KY
1st Bn, 1st Bde, USAARMC	Ft. Knox, KY
2d Bn, 1st Bde, USAARMC	Ft. Knox, KY
3d Bn, 1st Bde, USAARMC	Ft. Knox, KY
5th Cav Sqdn, 1st Bde, USAARMC	Ft. Knox, KY
3d Sqdn, 5th Cav (Air), 9th Inf Div	Ft. Lewis, WA
2d Bn, 77th Armor, 9th Inf Div	Ft. Lewis, WA
1st Sqdn, 4th Cav, 1st Inf Div	Ft. Riley, KS
1st Bn, 63d Armor, 1st Inf Div	Ft. Riley, KS
2d Bn, 63d Armor, 1st Inf Div	Ft. Riley, KS
4th Bn, 63d Armor, 1st Inf Div	Ft. Riley, KS
*4th Sqdn, 12th Cav, 5th Mech Div	Ft. Polk, LA
1st Bn, 40th Armor, 5th Mech Div	Ft. Polk, LA
3d Bn, 77th Armor, 5th Mech Div	Ft. Polk, LA
*To be activated.	

SPECIALTY TRANSFER REQUEST

Requests for specialty transfer by field grade officers from overaligned to underaligned specialties are currently being enthusiastically accepted. Conversely, transfer requests from under-aligned to over-aligned specialties are discouraged. The moratorium on company grade transfers will remain in effect. Proper alignments in terms of numbers of skills and utilization opportunities within and between specialties is the primary goal of the specialty designation process. The tables below show under-aligned and over-aligned specialties for field grade officers as of 15 Oct 75.

Under-aligned Specialties

(Shortage of Officers Designated these Specialties)

<u>LTC's</u>	<u>Majors</u>
21 Engineer	21 Engineer
27 C-E Engineer	27 C-E Engineer
31 Law Enforcement	31 Law Enforcement
37 Cryptology	37 Cryptology
44 Finance	44 Finance
49 ORSA	52 Atomic Energy
53 ADP	93 Logistics Services
93 Logistics Services	Management
Management	95 Transportation Management

Overaligned Specialties

(Excess Number of Officers Designated these Specialties)

<u>LTC's</u>	<u>Majors</u>
36 Counterintelligence	28 Audio-Visual
54 Operations and Force Development	36 Counterintelligence
	42 Personnel Administration
	77 Tank and Ground Mobility
	Materiel Management

If you fall into one of the overaligned specialties don't panic because the situation is manageable under OPMS with the exception of Operations and Force Development. This specialty at the grade of LTC is clearly the most over-aligned specialty. Operations and Force Development has 636 positions at the grade of LTC and is projected in 1981 to have 269 positions at the grade of COL. These positions have 1,873 LTC's aligned against them. Through the use of a computerized simulation model of the officer assignment and promotion systems, OPD predicts that approximately 500 of these LTC's will not have an opportunity to serve in the specialty at the grade of LTC. Furthermore, this population of 1,873 LTC's is anticipated to produce an average of 90 COL's who also will not have an opportunity to

serve in this specialty. For these reasons, LTC's in this specialty who possess logistics aptitudes are encouraged to request transfer to a LOG specialty to enhance the utilization of skills in two specialties. These conditions exist only at the current serving grade of LTC. If you are a LTC in the Operations and Force Development specialty, it would be in the best interest of all concerned for you to assess your capabilities, qualities and attributes for another specialty. Get in touch with your primary specialty manager in your grade division for assistance and guidance.

TERMINOLOGY

The terms "primary specialty" and "alternate specialty" are in need of explanation. There is a tendency to consider the primary specialty as the more important of the officer's two specialties. This is not necessarily the case. For most officers, the primary specialty is the one which receives initial emphasis during the company grade period. At the field grade level, utilization in the officer's primary specialty will depend on the combination of job opportunities in both the officer's primary and alternate specialties. Field grade combat arms officers can anticipate that they will spend the majority of their time in their alternate specialty because of the relatively low number of Army requirements for combat arms specialties at the field grade level. Therefore, principal utilization can be expected to be in their alternate specialty.

AVIATION SPECIALTY

Aviation has become a separately managed advanced entry specialty. This new concept is keyed to meeting field grade aviator requirements. Prior to flight school, prospective aviators will be trained and assigned based upon their basic entry specialty. Officers from Infantry, Armor, Field Artillery, Air Defense Artillery, Engineer, Signal Corps, Transportation Corps, and Military Intelligence branches may apply to enter flight school between their 24th and 60th month of active commissioned service. Officers participating in basic entry specialty Aviation Materiel Management will attend flight school subsequent to completion of the Transportation Officers Basic Course. Development of the aviation specialty has not effected the Medical Service Corps program which will continue to be managed by The Surgeon General. □

Training Support Update

The correspondence subcourses listed below are now available. Individuals may obtain them by mailing a completed DA Form 145 to the Armor School, ATTN: ATSB-TS-AD, Fort Knox, KY 40121.

ARM 102 — Track Vehicle Maintenance (11E) (NEW)

Crew maintenance services of the *M-60A1* Tank and the *M-551 AR/AAV*.

ARM 133 — Management Practices (NEW)

The functions of the manager and of management; motivation techniques; preparation of a Work Distribution Chart and a Flow Process Chart; purpose of a Layout Chart; computation of a time standard, standard man-hours and a performance effectiveness ratio; and elements of quality assurance.

ARM 135 — Civil Disturbances (NEW)

Legal requirements and restrictions in conducting civil disturbances; tactics and techniques employed in performing a civil disturbance mission; procedures for apprehending and detaining civilians; and functions of military support in disaster relief and civil defense.

ARM 158 — Night Vision Devices (REVISED)

Description, general data, operation, and maintenance of Night Vision Devices *AN/PVS-2* (Starlight Scope), *AN/TVS-2* (crew-served weapons), and *AN/TVS-4* (Night Observation Device—NOD).

ARM 165 — Mine Warfare (REVISED)

U.S. mine warfare doctrine; standard U.S. mines, fuzes, and firing devices and their employment; functional types of minefields; methods of laying, marking, reporting, and breaching minefields; and defense against mines.

ISS 208 — Command and Staff Procedures (REVISED)

Organization of the brigade and battalion staff; duties and functions of principal and special staff officers; staff actions related to the commander's decision at brigade and battalion level; and responsibilities of staff members in the formation of staff estimates, including content and practical use in solving military problems.

ARM 563 — Operation Orders and Plans (REVISED)

Purpose and types of combat orders; use of military symbols and control measures; preparation of warning and fragmentary

orders; format and content of operation orders; and development of an overlay-type order.

ARM 575 — Armor Defense Operations (NEW)

Fundamentals of defense; differences between area and mobile defense; fixing forces in the mobile defense; reserve in the mobile defense.

ARM 580 — Armor Retrograde Operations (NEW)

Fundamentals of retrograde operations; difference in techniques used in conducting a withdrawal under enemy pressure and not under enemy pressure; mechanized task force as part of a brigade in withdrawal; tank task force as part of a brigade in delay.

NEW TRAINING CIRCULARS

The following is a complete list, as of 30 September 1975, of new Armor training circulars which have been printed and distributed by Department of the Army.

TC 17-4	Tank Gunner's Guide (90-mm Gun, <i>M-48A1</i> Tank)
TC 17-5	Tank Driver's Guide (90-mm Gun, <i>M-48A1</i> Tank)
TC 17-6	Tank Loader's Guide (90-mm Gun, <i>M-48A1</i> Tank)
TC 17-12-1	Tips for Tanker's — Defeating Soviet Armor
TC 17-12-2	Training Tank & <i>Sheridan</i> Crews to Shoot
TC 17-12-3	Tips for Tankers — Battlefield Gunnery Techniques for Tanks
TC 17-12-5	Tank Gunnery Training
TC 17-15-1	Tank Platoon Battle Drill
TC 17-15-2	Maintenance Tips for the Tank Platoon Leader
TC 17-15-3	Tank Platoon — Organization for Combat and Techniques of Movement
TC 17-15-10	Know Your GOER's—Tips for Leaders

TC 17-18	Operator Training Course, Combat Vehicle <i>M-60A1</i> Tank	020-171-5351-F	Boresighting the Main Gun, Rangefinder, Gunner's Telescope and Periscope, <i>M-60/M-60A1</i> Tank, Part I
TC 17-19	Track Vehicle Mechanic Course, Combat Vehicle <i>M-155 Sheridan</i>	020-171-5352-F	Boresighting the Machineguns, <i>M-60/M-60A1</i> Tank
TC 17-20	Operator Training Course, Combat Vehicle, <i>M-551 Sheridan</i>	020-171-5353-F	Zeroing the Main Gun and Machineguns, and Setting the Battle-sights, <i>M-60/M-60A1</i> Tank
TC 17-21	Organization Mechanic/Repairman Course, Combat Vehicle (Turret), <i>M-551 Sheridan</i>	020-171-5354-F	Boresighting the Xenon Searchlight, <i>M-60/M-60A1</i> Tank
TC 17-22	Operator Training Course, Combat Vehicle, <i>M-113/M-113A1</i>	020-171-5355-F	Boresighting the Main Gun, Range Finder, Gunner's Telescope and Periscope, <i>M-60/M-60A1</i> Tank, Part II
TC 17-36-2	Armored Cavalry Platoon — Organization and Techniques of Movement	020-171-5361-F	Initial Fire Commands, <i>M-60/M-60A1/M-60A3</i> Tank
TC 21-6-1	Use your Training Publications	020-171-5364-F	Machinegun Engagements, <i>M-60/M-60A1/M-60A3</i> Tank
TC-21-6-2	Techniques of Using and Making Sand Tables	020-171-5366-F	Before-Operation Maintenance Checks and Services, <i>M-60/M-60A1</i> Tank, Part I
TC 71-4-2	The Tank/Mechanized Infantry Team	020-171-5367-F	Before-Operation Maintenance Checks and Services, <i>M-60/M-60A1</i> Tank, Part II
TC 71-5	REALTRAIN — Tactical Training for Combined Arms Elements	020-171-5368-F	During-Operation Maintenance Checks and Services, <i>M-60/M-60A1</i> Tank
		020-171-5369-F	After-Operation Maintenance Checks and Services, <i>M-60/M-60A1</i> Tank, Part I
		020-171-5370-F	After-Operation Maintenance Checks and Services, <i>M-60/M-60A1</i> Tank, Audio-Only (cassette), Part II
		020-171-5334-E	Preparing the Ballistic Computer for Operation, <i>M-60/M-60A1</i> Tank
		020-171-5375-E	Manual and Power Turret Operation, <i>M-48A1</i> Tank
		020-171-5376-E	Ballistic Computer Operation, <i>M-48A1</i> Tank
		020-171-5377-E	Range Finder Operation, <i>M-48A1</i> Tank
		020-171-5378-E	Boresighting and Emergency Zero, <i>M-48A1</i> Tank
		020-171-5379-E	Starting and Stopping the Engine, <i>M-48A1</i> Tank
		020-171-5380-E	Loading and Unloading the Main Gun, <i>M-48A1</i> Tank
		020-171-5381-E	Misfire Procedures, <i>M-48A1</i> Tank

AUDIO-VISUAL LESSONS

As of 30 September 1975, the following Armor TEC lessons had been completed and released for distribution to the field.

FILE NUMBER	TITLE
020-171-1611-F	Target Range Determination
020-171-1634-F	Boresighting the Searchlight, <i>M-551 AR/AAV</i>
020-171-5301-F	Preparing the Circular Range Card
020-171-5331-F	Tank Ammunition, <i>M-60/M-60A1/M-60A3</i> ; Selecting
020-171-5332-F	Tank Ammunition, <i>M-60/M-60A1/M-60A3</i> ; Handling
020-171-5339-F	Placing the Turret in Power Operation, <i>M-60/M-60A1</i> Tank
020-171-5340-F	The Range Finder, Part I — Familiarization, <i>M-60/M-60A1</i> Tank
020-171-5341-F	Preparing the Ballistic Computer for Operation, <i>M-60/M-60A1</i> Tank
020-171-5343-F	Operation of the Xenon Searchlight, <i>M-60/M-60A1</i> Tank
020-171-5346-F	105-mm Main Gun: Loading
020-171-5347-F	105-mm Main Gun: Misfire Procedures
020-171-5348-F	105-mm Main Gun: Unloading

LASER GUNNERY TRAINING FOR M-48A1 TANKS

A member of the Reserve Component Training Center (RCTC), and two members of the Training Aids Services Office (TASO), Fort Dix, NJ, have developed two "adapter brackets" that extend the applicability of laser gunnery trainers, 17-33 and 17-56, for use with the *M-87* .30 cal machinegun cradle assembly in the *M-48A1* only.

The brackets are designed to be attached to the cradle assembly of the *M-87* machinegun and allow for the use of both laser devices. The adjustable bracket in figure 1 will accommodate either the 17-33 or 17-56 laser devices. The bracket in figure 2 will fit the newer 17-56 laser only.

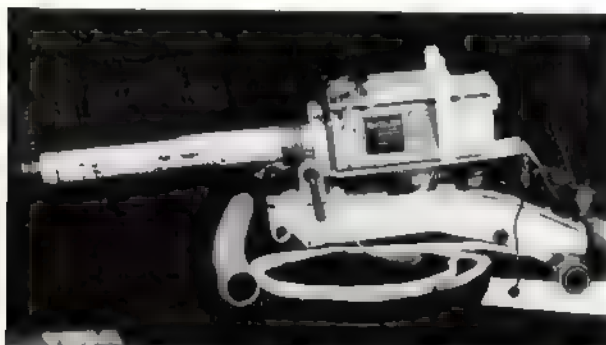


Figure 1

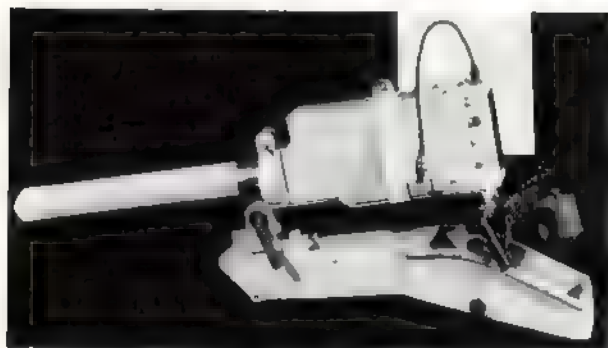


Figure 2

Research and development results were evaluated at Fort Knox, and a recommendation by the evaluator was given for adoption of the brackets throughout CONUS. Blueprints are being sent to all concerned TASO's for local fabrication.

Supporting TASO's have the capability for fabricating the brackets and the reflective-tape targets that are used with the laser device.

However, using units must provide the laser device as well as the reflective tape that is used for the targets. Distribution of the laser devices was begun this fall and should be nearing completion.

NEW ENGINE DIAGNOSTIC SYSTEM

A new engine diagnostic system that is easy to use, that will reduce maintenance costs, and improve vehicle readiness has been developed by the U.S. Army Tank-Automotive Command.

Consisting of a lightweight, portable vehicle test meter, the system connects to a diagnostic connector assembly built into the vehicle.

A flip-card catalog mounted on the front panel of the test meter contains more than 30 tests and measurements that a mechanic can perform on both gasoline and diesel engines, as well as the vehicle starting and charging systems. To check a malfunction, a mechanic need only connect the test meter to the diagnostic connector on the vehicle, locate the test number in the catalog, set the switches on the control panel, and press the button. The test results are displayed immediately.

The trial and error approach frequently used to pinpoint the cause of a vehicle malfunction is eliminated by the new diagnostic system. The system is easy to hookup and use, and has built-in protection against damage from an improper hookup. Only three days are required to train a mechanic to become skilled in operating the system.

The initial cost of a vehicle will be higher with the diagnostic system, but the lower maintenance costs over the life of the vehicle will more than offset the higher purchase price.

Operational tests and troop evaluation of the system while installed in a 1/4-ton jeep, 2 1/2-ton truck, armored personnel carrier, and a tank are now underway at Fort Knox.

COMMERCIAL VEHICLES TESTED FOR MILITARY USE

Tests are being conducted by Headquarters, Modern Army Selected Systems Tests, Evaluation and Review (MASSTER) on four-wheel drive, commercial vehicles as possible replacements for the *M-151A2* 1/4-ton truck now being used by the Army.

Because of the high expense involved in militarizing the *M-151A2* with special parts and equipment, the purpose of the test is to find a commercial four-wheel drive vehicle that can perform the same functions in some roles as the *M-151A2*, at a reduced cost to the government.

The ten vehicles that are being tested at Fort Hood include two *CJ's* from American Motors, two *Blazers* from General Motors, two *Scouts* from International Harvester, two *Broncos* from Ford, and two *Ramchargers* from Chrysler.

No changes will be made to the standard production models, except for replacing standard white-sidewall tires, repainting, installation of blackout kits, and installation of 12-volt power converter systems. The vehicles will be camouflage pattern-painted to allow them to participate in normal field exercises.

The vehicles will be tested specifically on off-road and on-road performance, capability to negotiate mud and water obstacles, and overall maneuverability. Cargo-carrying capabilities, ease in camouflaging, and how well they can be maintained and operated will also be considered.

The test will be run in three phases and last until early 1976.

Data gathered by MASSTER will be forwarded to the Army Materiel Command for further evaluation and determination if the vehicles can replace the *M-151A2* 1/4-ton utility truck.

NEW ISRAELI RECON VEHICLE



A model of the RBY Mk. 1 light armored reconnaissance vehicle was recently exhibited by Israel Aircraft Industries' Ramta Division. The 8-man, 4 x 4 vehicle, weighing approximately 4 tons, has a low-slung, monocoque armored hull. With a mine-proof underside and a rear-mounted 6 cylinder Dodge gasoline engine, the maximum road speed is 100 km/h, and the range is approximately 342 miles. The RBY Mk. 1 mounts a variety of weapons.

TWO NEW MINE AND COUNTERMINE SYSTEMS

Researchers at MASSTER (Modern Army Selected Systems Test, Evaluation and Review) at Fort Hood, TX, are examining two helicopter-delivered systems which can be utilized to clear enemy minefields and emplace "friendly" minefields quickly and efficiently.

FAESHED (Fuel Air Explosive System, Helicopter Delivered), a newly developed countermine measure, is designed to breach a minefield without creating the craters that usually result from an explosive-type demolition charge. The FAESHED is a modified Navy bomb containing three bomblets, each of which contains 72 pounds of an explosive gas, ethylene oxide.

Each bomblet has a 4-foot electronic probe, which causes the bomblets to explode at the desired level once the probe comes in contact with the ground.

The resultant ethylene oxide cloud is detonated by means of two delayed-time detonators which are thrown to each side of the cloud, creating a surface overpressure of 300 pounds per square inch. An area of 1,960 square feet can be covered by the cloud of a single bomblet.

Due to its overpressure, the FAESHED is effective in dealing with the enemy's minefields. The 300 p.s.i. easily demolishes most antitank, antivehicular, or antipersonnel devices used in the field.

Another potential use of FAESHED is as an offensive weapon against enemy air-defense artillery positions, antitank weapons, radar installations, aircraft and airfields, and enemy fortifications.

The other system being tested by MASSTER—the *M-56* Mine Dispersing Subsystem—is similar to FAESHED because it is also helicopter-delivered, but differs entirely in purpose. The *M-56* system is designed to rapidly distribute mines in a specific area to restrict the movement of enemy troops and equipment.

The subsystem consists of two dispensers on the helicopter, each containing 40 cannisters. Each cannister holds two 6-pound mines, giving a total delivery capability of 160 mines.

Several roll-resistant and antidisturbance mines are distributed among the two basic types of mines, antitank and antivehicular, making it virtually impossible for the opponent to neutralize the mines safely. □

NAPOLEON'S ARMY

by H.C.B. Rogers. Hippocrene Books, Inc. 174 pages. 1974. \$10.00.

All of us who have studied the Napoleonic campaigns have searched for a more detailed picture of the individual French soldier and the army in which he served. Napoleon's maxims explain most of the battlefield success, but we need to know more of the individual soldier to understand how the French Army was able to terrify Europe from 1798 through 1815. Colonel H. C. B. Rogers has provided us with that detail.

In his Introduction, he alerts us to the fact his work is not another history of the campaigns waged under the First French Republic and the First French Empire. His object is to provide a minute description of the French Army as it existed and changed during the 25 years from the Battle of Valmy to the Battle of Waterloo. The opening chapter provides a brief narrative of the more important army campaigns and serves as a backdrop for the detail in the following chapters, in which he describes the Cavalry, Infantry, Artillery, Engineers and Signal, Administration, Medical, and Imperial Headquarters. Detailed information is given on each arm and service, to include its organizations, uniforms, equipment, tactics, and tactical employment. The modern staff officer will be enthralled by the meticulous planning, issuance of orders, and the supervision of Berthier and other members of the Imperial Staff. Examples, such as the movement of the Imperial Guard, a force of over 10,000 men, from Paris to Mayence, a distance of more than 344 miles in six days, will boggle the mind of the helicopter-age officer.

Colonel Rogers brings the detailed description of the arms and services into focus by telling us of the exploits of the Third Corps, one of Napoleon's best units at Auerstaedt and later in Poland. These two examples, added to another chapter dealing with the experiences of a junior officer, show how the various matters described in previous chapters were applied to joint operations of all arms in the field.

Specific examples provide you, over 100 years later, a means to appreciate

the flexibility of the organizations and their responsiveness to command. Students of armor warfare will be particularly interested in Napoleon's method of command and his use of special task forces to respond to the changing battlefield. So habitually did he make use of these formations that each headquarters had assigned a special aide-de-camp who took command of units thrown together to breach the gap or exploit a local success. It was not uncommon for a corps or division commander to take command on the spot and, through his personal example, attain success when the issue was in doubt.

The book is well illustrated with maps and photos of the soldiers described. It is an invaluable reference for the serious student of the Napoleonic era and provides the reader with a better understanding of the genius of the commander and the quality of the men he led. Both of these elements were integral to Napoleon's success on the battlefield.

Colonel Corwin A. Mitchell
USATCA

CRIMSON DESERT: Indian Wars of the American Southwest

by Odie B. Faulk. Oxford University Press. 257 pages. 1974. \$8.95

Crimson Desert spans a period of 38 years, from 1848 to 1886. It tells a tale of war and death, torture and murder, theft, and exile as the bases of negotiation in which the "vaunted" American "melting pot" failed to work, and in which there could be no compromise short of total surrender on one side or the other.

The book is organized into three main parts dealing with the confrontations with the Navaho, Comanche, and finally, the Apache tribes. *Crimson Desert* also gives an account of the passive Indian tribes such as the Pueblos, Pimas, Papagos, Maricopas, Yumas, and Mohaves. The reader soon realizes that the aforementioned Indians had little the "whites" wanted, primarily because their homelands comprised mostly deserts and mountains, in which the whites

saw little economic potential. These tribes were quickly settled on reservations and posed no major threat to the frontiersman. The other — Comanches, Navahos, and Apaches — could not be ignored due to their disquieting habit of raiding and capturing women, children, mules, horses, and other property.

Wars of tragic proportions followed. For the Indians, raising an army was no problem. Their men, young and old, were warriors trained to believe in the glories of the warpath, and they fought for those things people have held most dear: their homes, religion, and way of life. To them, the encroaching American settlers posed a physical and psychological threat, one to be eliminated. The whites, on the other hand, thought they owned the land by right of conquest. They regarded the Indians as little better than wild animals, an impediment to civilization that was not making productive use of the land.

Thus began a bitter struggle for supremacy over the land. The Americans turned to their army to obtain what they themselves could not. The Army assumed its mission to mean either annihilation or confinement of the enemy. Yet, Congress and the President did not always provide an army capable of performing the task demanded of it. The federal government never gave the Army authority to oversee the Indian problem. In the year 1849, however, the Indian Bureau was established under the Department of the Interior to assist the Army once the hostiles were placed on reservations.

Before the Civil War, Congress preferred to send infantry rather than cavalry to fight the Indians, purely because an infantry force could be maintained for substantially less than a cavalry force. This meant of course, that the infantry was completely outclassed on the battlefield by some of the world's best cavalrymen, the Plains Indians. Both before and after the Civil War, soldiers were called upon to fight with antiquated weapons and equipment against Indian adversaries who often had more modern firearms.

Crimson Desert also studies attitudes and characters of our leading military leaders of the time. The author paints a rather objective picture of their weak and strong points when he discusses the various campaigns they fought against the Indians. His insight into the prevailing mood of the country at the time and

the Indian way of life, clearly indicates why the Indian Wars were inevitable

Crimson Desert also draws close parallels to our most recent Vietnam experience, the conflicts between the Army representatives and the Indian agents representing the government being a case in point. Another being the frustration and anger at having reservation boundaries become sanctuaries in which the Army could not have a free reign to control or combat renegades, even though charged with keeping the peace by keeping the Indians confined. *Crimson Desert* is thought-provoking. It is an excellent primer for students of the Southwest.

Major Charles E. Griffiths
AUS-Retired

THE PENINSULAR CAMPAIGN: McCLELLAN AND LEE STRUGGLE FOR RICHMOND

by Joseph Cullen. Stackpole Books. 192 pages. 1973. \$8.95.

The publisher's attempt to generate interest and controversy in the Civil War Peninsular Campaign through author Joseph Cullen's finding that McClellan was a distinct failure as a field commander should fall, in my opinion, on deaf ears. That conclusion has been reached by amateur and professional Civil War buffs virtually in unison whenever discussion centers around the campaign. No, the quest for controversy will not save this superficial effort at military history. I am afraid nothing will.

Cullen's source material is incom-

plete (conspicuously absent in his use of primary source data); his character studies of the leading protagonists are hastily drawn, stilted, and contain little insight into their personalities; the narrative contains many inaccuracies; and the illustrations are, for the most part, illegible and of dubious value (they are extracted from the multivolume series entitled *BATTLES AND LEADERS OF THE CIVIL WAR* and are not clear). I definitely feel that a reader would better spend his time reading Douglas S. Freeman's account of the "seven days" in Lee, or with the corresponding information in *The West Point Atlas of American Wars*.

The single saving grace in this book is Cullen's generally excellent assessment of the Peninsular Campaign as a whole, for, as he states, the campaign did prove Lee an able successor to Johnston; it did remove the Federal threat to Richmond; and it did begin in the Army of Northern Virginia the refinement of the most formidable fighting army that wore the Confederate grey.

Lieutenant Colonel John G. Fowler, Jr.
USACGSC

STRATEGY FOR TOMORROW

by Andre' Beaufre. Crane, Rusak and Company, Inc. 91 pages. 1974. \$7.50.

Andre' Beaufre was director of the French Institute of Strategic Studies before his death. As its head, he sought meaningful approaches to peace in the current international situ-

ation by defining the realities of nuclear parity, the movement toward nationalism, and the role of conventional forces. A noted French general, his service on Gamlin's staff in World War II, on DeLattre's staff in Indochina, as commander of the ground forces in Suez, and on the NATO staff in the sixties, explain his preoccupation with strategy.

His earlier books: *Introduction to Strategy*, *Deterrence and Strategy*, *Strategy of Action*, and *Building the Future*, all address the security of Europe as viewed by a Frenchman. *Strategy for Tomorrow* is no exception. In this volume, General Beaufre examines the current status and future directions of West European deterrence and defense. He seeks answers to four of the most basic and vital questions of western security policy today: how to sustain extended deterrence in Europe in an age of superpower strategic parity; how to adapt conventional force structures and tactics to changing conditions of offensive and defensive warfare and military technology; how to define the deterrent and defensive roles of tactical nuclear weapons in western security; and what the complications of these factors will be for the U.S. and West European national military force postures in the future?

In this volume, Beaufre explains the need for conventional deterrence as it is currently used by China and Yugoslavia. His proposed solution for the organization of territorial militia relates closely to the French territorial organization, which currently forms an integral part of France's defense along with their strategic nuclear force, tactical nuclear force, and conventional force.

In conclusion, General Beaufre unveils for us three futures: one classic, another optimistic, and the third pessimistic. Since it is too early to tell what the future will hold for us, we must be prepared to work toward the classic solution. In this light, General Beaufre stated, "Those who continue to be interested in military careers should be reassured. Their future remains similar to that of their predecessors. History evolves, but the phenomena to which it gives birth, although different in form, remain strangely the same in essence."

This book is a must for anyone trying to understand the national defense of our West European NATO allies.

Colonel C. A. Mitchell
USATCA

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Pages from the Past

IN DEFENSE OF THE ARMY

Our soldiers in the Philippines have been attacked because they occasionally did something wrong, but on the whole the men who followed the flag of the United States have added a new page to the honor roll of the nation. In the steaming heat of the tropic jungles, starving, footsore, so weary that they dropped in the mud wherever they happened to fall; and at every step fearing ambush from a foe who was felt before he was seen — those men had, indeed, a heavy burden to bear, and I think that the men who sat at home could have afforded to be more lenient in bearing judgment against them.

(From a speech by President Theodore Roosevelt which appeared in the September 1902 issue of the Cavalry Journal. — Ed.)

A JUNIOR OFFICER'S LAMENT

In summation it may be said that the principal causes of any observed lack of initiative and spirit of leadership in juniors are—

1. A long existent deep rooted strangle hold grip of beaureaucratic administration. Papers must be kept straight whether the battle be won or lost.
2. Centralization of control, command and instruction.
3. Insufficient basic instruction.
4. A failure on the part of a majority of those charged particularly with instruction to realize and visualize necessities and to take advantage of such latitude as is given them to decentralize

and to force subordinates to assume responsibility and the initiative.

This presents another question: Will a David arise to slay this Goliath? Who will cut the Gordian knot?

The Cavalry Journal
January 1918

WITH APOLOGIES TO OTHER BRANCHES

The Pershing Expedition into Mexico proved the cavalry arm to be the only arm which could successfully operate south of the Rio Grande, aggressively. Without reflecting adversely on our brothers of the infantry and field artillery, they were simply armed guards of camps and communications in Mexico; the engineers proved good road builders only; and the aviation corps failed to render only notable service. It was the cavalry alone which secured results; and had armed resistance to our forces continued, the brilliant handling of our cavalry would undoubtedly have been still more in evidence. Comparisons are odious, but so much has of late been said as to the archaic uselessness of cavalry in the light of aeroplanes, motor-trucks, and other present day mechanical devices for increasing mobility and celerity of action by troops not classified as "horse soldiers," that the lessons of northern Mexico should not be overlooked.

The Cavalry Journal
January 1918



Coming in **ARMOR**

"U. S. Readiness - Reality or Myth?"

Captain John P. Baker presents a comparative analysis of American and Soviet-armed forces, and suggests improvements in conventional U.S. defense capabilities in order to retain our ability to respond flexibly to the potential Communist Bloc threat in Europe.

"The Reconnaissance Dilemma"

In the search for the ideal scout vehicle and in preparing for the first battle of the next war, Staff Sergeant Peter L. Bunce cautions that encumbering the scout with excessive, complex equipment and equipping him with tanks that can't keep the pace could hamper mission accomplishments and negate the effectiveness of the scout on the modern battlefield.

"A Yankee Inventor and the Military Establishment"

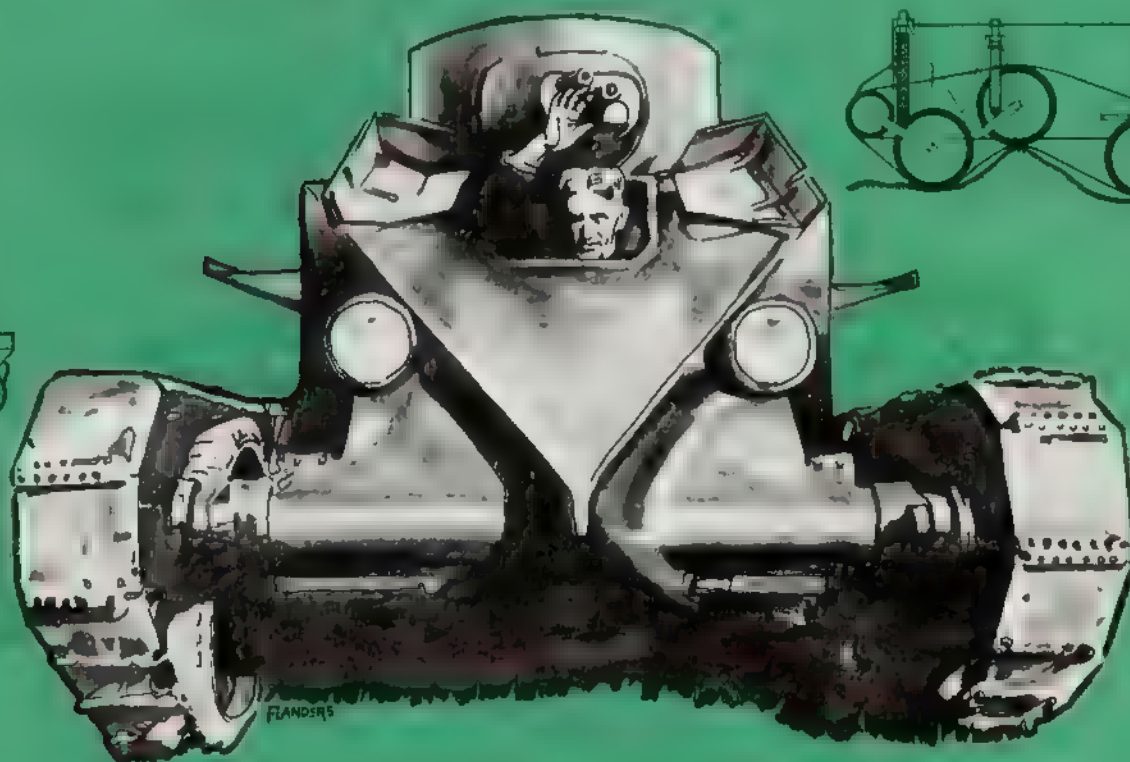
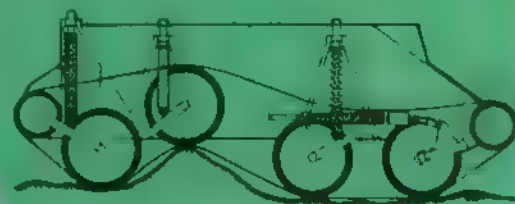
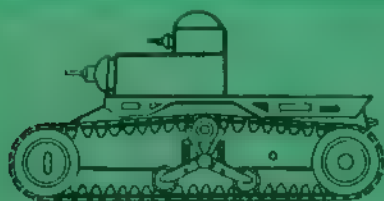
Outlining the history of the relationship between armor designer J. Walter Christie and the Army Ordnance Department, Mr. George C. Hofmann regrettably recounts how their incompatibility deprived the Army of some very advanced armored vehicles in the 1930s.

"A Comparison of Night Fighting Capabilities"

Major William G. Privette evaluates the night fighting capabilities of the U.S. and the Soviet Union, concentrating primarily on night observation devices.

ARMOR

march-april 1976



CHRISTIE:
A Yankee Inventor
and the Military Establishment

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Cover

The design genius of J. Walter Christie was not fully recognized in his time. George F. Hofmann examines Christie's frustration with Army bureaucracy in his article "A Yankee Inventor and the Military Establishment," beginning on page 13. (Cover by Steven Flanders)

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A Salute to Army Museums

Dear Sir:

As we all know, since the year 1775 to present, our Army has invested billions of dollars in the research and development of weapons. As a matter of fact, so have our enemies. It is because of our enemies that we strike for the superior creation, a case in point, the tank, a vehicle that can traverse the rawest of terrain, a gun that can hurl a projectile with devastating accuracy and a body that is armor protected.

However, only should a person be fortunate enough to serve with the military that there would be a probability that he might see weaponry like a tank. For this reason, the typical U.S. Army museums were set up. There happen to be many of these installations, some little known to the public. It is in these places that the visitor may take his or her time in the inspection of the museum displays. Such places represent not the glorification of war, but the technology of it.

Tanks represent a major factor of modern-day warfare and are well spoken for at such places as THE PATTON MUSEUM at Fort Knox and THE ORDNANCE MUSEUM at Aberdeen Proving Grounds. Recently, personally visiting both installations, I found bold design with clean new exhibits spelling out what war was as far as winning was concerned. Fully mindful that war is hell, the visitors swarm to the exhibits uttering such words as, "I never thought they were so big," or "No wonder it could do such damage." These people do have an admiration for these vehicles and the film flows like water.

Both museums show a fair portrayal of wear, battle damage, and camouflage of the vehicles when actually used. The Patton Museum goes one step further, it possesses old tanks in working order and mint condition. When I was there for the 86th Annual Armor Conference, I was delighted to find a U.S. M-4A3E8 with a driver in regulation World War II attire, circa 1944. He demonstrated the mobility of the vehicle and enthusiastically boasted of the fine restoring job that the museum staff had done. Many other vehicles were represented in similar ways. Fort Knox is the place if you appreciate the tank.

Should one go to Aberdeen, he

wouldn't be disappointed either. There they have a Tank Row with many U.S. tanks and self-propelled artillery dating from 1919 to 1966. They also have a tank park with Russian, British, German, and other vehicles used during the world wars.

Information about current U.S. military vehicles is not that hard to find either. Fort Knox's U.S. Army Armor School publishes many items that the civilian or noncivilian tank buffs may be interested in. (Some only to military members.) Civilian contractors involved with a particular vehicle sometimes have on hand brochures that are available. The Office of the Chief of Information, U.S. Army Command Information Unit, Washington, offers fact sheets that include pictures and characteristic data. Not to forget the civilian books that also offer pictures and a ready reference on tanks of the world.

If the enthusiast also likes other military ordnance, no matter if it be a rifle or a land mine or a machinegun or helicopter or just plain old military uniforms, there are many places where he may go to seek his hobby. The Armor enthusiast is a bold sort of human flesh, incased with a driving desire to examine up close the ordnance he is interested in. His exterior is studded with pride and patriotism toward his country. His stature is one of the few remaining 'Gung-Ho' breed who would violently oppose any liberal with misconstrued ideas of having no Army, no weapons, and an outright pacifist view. He also is indeed sober to the idea of peace not wanting, but believes in an America fully prepared and ready for war. To him I say . . . more power to you.

TOM CROCE

Flushing, NY 11351

Tom Croce is a high-school senior. Ed.

An Auxiliary Tank

Dear Sir:

In the May-June 1975 issue of *ARMOR*, Colonel Butler ("Less Bang for the Buck in Combat Vehicles") notes that inflation and production problems with big castings are decreasing the number of M-60-series tanks available. In the same issue, Mr. Williams ("Tank

Innovations") suggests two-tank system: one sophisticated for low-volume production, the other austere, low-weight and low-cost, produced in large numbers.

The problem is so immediate and the solution so cogent, it behooves all of us concerned with the development and use of armor forces to begin work on implementing Mr. Williams' suggestion.

In the interest of starting that process, I would like to point out that there are two possible approaches to Mr. Williams' "austere" tank. The first is a "stripped down" version of an existing tank. The second is a new machine designed from the ground up as an auxiliary tank.

The first approach would result in a tank very easy to integrate with existing maintenance, training, and tactical organizations. Moreover, to the extent that it used components common to the sophisticated version, it would help to decrease the cost of its big brother.

Unfortunately, it is probably not possible to leave out enough equipment on a modern tank to reduce the price sufficiently to allow a worthwhile increase in production rates.

To understand this, one merely has to imagine an austere M-60-series tank. It would be, for example, an M-60A1 arranged for the commander to do his own gunning. You save the cost of a gunner's seat and controls, the gun stabilization system, the electronic fire control computer, and the commander's cupola. Peanuts. But the M-60 is such a well integrated general purpose fighting machine, it is impossible to leave anything else out and retain the capability to fight in the same formation with its sophisticated brother, the M-60A2.

The words "general purpose" in the above comments provide the clue as to how to start work on the second approach. Since a really cheap general purpose tank is impossible, we want a low cost, specialized, auxiliary tank. Ideally, the cost should be low enough to allow procurement of several versions for different tasks. One imagines, for example, different versions serving as tank destroyers, infantry support vehicles, antihelicopter gun platforms, command and reconnaissance vehicles, and convoy escort vehicles.

The wide use to which variations on the *M-113* theme have been put tells me such an approach is at least theoretically possible, but the *MBT-70* fiasco and recent work on the *XM-1* leads me to say that anyone who really thinks it will be done in the U.S. is so hopelessly optimistic he probably won't bother to prepare for war at all. Meanwhile, the Russians have long since produced the beautiful little *PT-76* and its variants.

BILL BALDERSTON

Washington, D. C. 20010

The Army Scouts of Today and Tomorrow

Dear Sir:

Most articles directly or indirectly show confusion about the future of Armor and Armored Cavalry. However, one thing for certain that everyone must agree upon is that whatever we redesign or develop will cost more and more money in a much more inflated world.

The subject that I want to write about in particular is the Army scout of today, whatever specific job he is doing; aerial scout, scout platoon, armored cavalry, experimental motorcycle, etc. All these jobs serve one basic purpose to the commander, they gather immediate tactical intelligence for him and, in turn, are organic to his unit so obviously always available. Now let's back up and look at what we are trying to make them into.

Armored Cavalry. The 3 for 5 concept is a glorified armor-defeating force that's very vulnerable to being defeated as a tank unit by enemy infantry with antitank weapons, enemy air observation, enemy COMSEC interception, enemy listening devices, and, last but not least, the enemies own armored force.

The Scout Platoon. First off, we give them an *M-114A1E1*. I'm sure I don't have to elaborate on this particular vehicle; its unpopularity is well known. We mount it with a 20-mm gun, *M-72 LAW*, hand grenades, *M-16's* and other combat arsenal items. We have developed a fighting force.

The Aerial Scout Platoon. The cost of their equipment and its upkeep is high to say the least. Their ability to perform all missions required in gathering information is questionable due to three things: the glare of the sun off windshields, size of their aircraft and, on a still day, the noise they make. If they go into a ground hover, they expose their position by flying debris,

waving grass or, in a wooded area, waving tree limbs.

Now, to talk about my opinion as to what the scout should be and what he needs to perform his mission. Also the various intelligence gathering missions they could perform.

Take for instance, the back-packed rockets. Because of the high chances of the scout being detected, it would be 1 man, not 3 or 4 men, which is the normal crew of our vehicles of today, that would be captured or killed. These men could and should be controlled from the ground by an officer who has communications with them at all times and a recording device to record, in their own words, everything they see without worrying about a specific format for sending information.

* * * * *

The scout should be the true eyes and ears of his parent unit. He cannot be a fighting force because if he has the equipment to fight with, most of the time that's what he'll do. Consciously or unconsciously, when he goes out on his mission, he has prepared himself to fight. In a future war, all of his equipment and training must be oriented toward seclusion and deception and to allow him to do his job, "the eyes and ears."

* * * * *

In the future Army, I sincerely hope that it will be simple enough to allow our primary concern and training to be totally dedicated toward the job we're out there to do. The scout of today and the future must be able to properly identify and report enemy locations, equipment and material while maintaining his own seclusion, deception and overall security.

* * * * *

I hope I've said enough to get my thoughts across to everybody.

ROBERT R. EASLAND
Sergeant First Class
Scout Platoon Sergeant

TC 17-12-3 Defended

Dear Sir:

I am replying to a letter by Lieutenant McCaig published in the May-June 1975 issue of *ARMOR*. First of all, I believe Lieutenant McCaig is referring to TC 17-12-3 not TC 17-15-3 in his letter.

Lieutenant McCaig contends firing fast first without accuracy is poor doctrine. Absolutely! I don't believe it is the intention of the Armor School to train crews to shoot fast but carelessly

at enemy targets. The emphasis in TC 17-12-3 is engagement of enemy targets quickly without sacrificing accuracy, emphasizing battlesight gunnery techniques. If the crew is properly trained, accuracy and speed will be achieved. The techniques of engagement as outlined in TC 17-12-3 *Battlefield Gunnery Techniques for Tanks* are provided to give tank crews a "quick draw" capability below 1,600 meters. The crew which combines these qualities will be the crew which survives on the battlefield.

Second, in desert environments where visibility is greater, it will not be feasible to hit all visible targets, at least not with direct fire weapons, however, it is important to emphasize to our crewman that when he begins to close within range of the enemy's direct fire weapons the enemy has the capability to hit and kill him. Although hit probabilities at intended ranges may be small, the capability to hit still exists. This point is emphasized to make our tank crews make proper use of terrain to avoid or minimize exposure, therefore reducing our vulnerability. The Armor School does not teach engaging the enemy beyond the effective range of our weapons, however, experience gained in the October War confirmed that some tanks achieved hits in excess of 4,000 meters. The commander decides at which ranges to engage targets, however, he has the capabilities to hit at extended ranges.

Lieutenant McCaig should be commended for his interest and comments. We need more soldiers to question doctrine new or old.

JOHN B. WHITEHEAD III
Captain, Armor
Fort Knox, KY 40121

Ideas on Tank Gunnery

Dear Sir:

I'd like to pass on some ideas that we came up with here at Camp Lejeune on tank gunnery training. Table II, at best is rather boring after the first rounds are sent down range. To add some realism to it, and in line with the new TC put out by the Armor School, we've taken a target, landscape, paper NSN 6920-00-713-8253, (found in TM-9-6920-210-14), and used it for our table II. This is a set of paper targets measuring 20 feet by 26 inches. It's a set of 10 sheets of paper with a black and white landscape drawing on it. To this, we've added stenciled targets consisting of tank silhouettes (front and side),

APC's, antitank weapons, and troops. These are to scale as near as possible to their location on the drawing. We've made stencils from cardboard and used spray paint to put them on the target.

In the future, we hope to include recognition training by making the stencil's resemble the potential aggressor's vehicles. When our unit receives a sub-caliber device for the main gun, or the laser training device, we will use this target with it to enhance such training.

In regards to training our crews to react to enemy missile firings, though we haven't done it yet, we have come up with an idea to position a rifle grenade launching device down range, and by command means fire a red streamer up range. The launcher is to be positioned at the side of the range, and when fired upon, the tank will react (hopefully) by firing at the target within the fan. The range of the streamer is about 200 meters, and if positioned down range about 1,500 meters, will not endanger the personnel or equipment up range. We've still got a problem with the means to launch the grenades, but are working on it. If anyone comes up with the answer, please let us know.

I hope that these ideas can help our tankers get their rounds out first, and with the best results.

GERARD W. HODUM

Master Gunnery Sergeant

Camp Lejeune, N. C. 28542

Cobra: A Fighting Vehicle

Dear Sir:

Congratulations to LTC Funk for his fine article "Let's do Something with the Cobra." I tried unsuccessfully to get such an article published some three years ago. The helicopter (*Cobra*) is no longer a special-mission-type machine—it is, or should be, a fighting vehicle.

It is time we exploited the helicopter just as Germany did the tank in World War II. In many ways, it seems to me, we are making the same mistake the French did—they prepared to refight World War I and were outflanked by the panzers. A properly armed helicopter is a tank killer and our aviation industry can produce helicopters by the hundreds per month as opposed to, currently, 100 tanks per month. Consider also, all this damage and mayhem is being done by a crew of two. I am not advocating the demise of the tank, we just need to beef up our tank-killer capability.

While I am not privy to high level budgetary "trade offs", it does seem to me we are not taking full advantage of this most versatile vehicle, i.e., the ability to rapidly mass a great deal of firepower. I maintain, three or four companies of *Cobras* roaming a division area would definitely keep the opposition alert.

How will we pay for these extra *Cobras*? Partly by eliminating all the airway navigation equipment as LTC Funk suggests. All we need is FM and VHF homing capabilities at the FEBA and perhaps only FM. Never mind the argument about how are we going to get the *Cobra* to the FEBA during really bad weather. If the weather is so bad a helicopter can't fly, the opposition will not be moving too much either.

Since we have eliminated the airway instrumentation, we can reduce our instrument program by X millions of dollars and buy X number of fighting *Cobras*. I am not advocating the total elimination of our instrument program. I would recommend we train 10-15 percent of our aviators as airway instrument pilots. Of these, 75 percent would be warrant officers who would be full time FW/RW pilots in flight detachments at division and above.

A simple, basic, vertical takeoff and landing vehicle with the armament configuration (more, if possible) recommended by LTC Funk is needed in the combined-arms team—Infantry, Armor/Aviation, Artillery.

A. W. WICKWARE

Lieutenant Colonel, Armor

Richmond, VA 23219

More on Combined Arms

Dear Sir:

From reading Captain Stewart's article on "The Balanced Combined Arms Battalion," I can only assume that he is one of the many who wish to improve the Army by reorganizing. What I failed to see was a need for change or any advantages significant enough to warrant the abandonment of a system that has been very successful since World War II.

We cannot afford to accept the two postulates without proof. The construction of a combined-arms battalion might create more problems than it would solve. Under our current system, deployment to a foreign area can be accomplished in a manner which will create any particularly desirable

tank-infantry ratio by sending the battalions required to make the ratio. How flexible would balanced combined-arms battalions be in an area where the desirable tank-infantry platoon ratio was two to one? Captain Stewart explains it adequately on the one or two battalion level; however, on the divisional or larger level, it just would not work without the addition of pure tank battalions.

It would appear that the "self-inflicted administrative wounds of attachment and detachment" are more the signs of inexperience than the inevitable result of the creation of company teams or task forces. I will not argue the contention that there needs to be more emphasis on combined-arms operations. There should be no doubt that the time spent on combined-arms training today is small when compared to the requirement for combined-arms operations projected in most combat scenarios. The answer here is more training, not reorganization.

The adoption of balanced combined-arms battalions would foster a combined-arms mentality. We do not need another mentality anymore than we need school solutions. What is required are professional and well-trained units which have the flexibility to work by themselves, or with others to accomplish any given mission. Again this is a requirement for more training, not reorganization. The internal flexibility might be desirable, but the loss of overall flexibility as mentioned above is a price too high to pay for it.

The final advantage of "staying power" created by the balanced combined-arms battalion's ability to cover more ground should be examined more closely in the light of the fact that a division would have fewer battalions. It does not appear that a division of balanced combined-arms battalions would have any more "staying" power than a division created of five armor and five infantry battalions.

It is not really important how many years have passed since the first *blitzkrieg*. It should be noted, however, that in the past few years there has been an increased emphasis on combined-arms operations at the Armor School and in the Army as a whole. This emphasis combined with more training will provide truly flexible combined-arms units (although not by TOE) capable of performing efficiently and effectively wherever they are required.

DOUGLAS S. AYKROYD

Captain, Armor

Fort Knox, KY 40121

Mercenaries

Dear Sir:

* * * Captain David Weber's "Mercenaries: Professionals or Outlaws?", while well-written, is less well informed. Captain Weber draws upon quite a few factual inaccuracies to form a number of rather presumptuous conclusions about mercenaries, all in support of his view (or, more exactly, Dr. Samuel Huntington's view) that social responsibility is coequal with proficiency in terms of the qualities of the modern professional soldier. In one sense, Captain Weber's entire discussion of mercenaries vs. national army soldiers within the framework of Huntington's opinions and those of Morris Janowitz is irrelevant, since both of those gentlemen discussed professionalism in a national army as something opposed to a "militia" army and, indeed, in both their studies, they concerned themselves solely with the "coming of age" of American Arms. It is doubtful whether either one gave much thought one way or another to the *ad hoc* corps of mercenaries that have formed in parts of the world less institutionalized and less stable than in Western democracies. However, to the extent that Huntington *does* go further than that, it is in an unrealistically and overly restrictive—my European friends would say, overly American—view. To the extent that Captain Weber does in fact echo Huntington, he demonstrates an even more "overly American" and excessively narrow concept of professionalism.

To begin with, Captain Weber's contention that men who fight for their units rather than their societies are not professionals ignores both history and human nature. Professional soldiers of standing armies since time immemorial have had a far clearer concept of what their unit stood for, could provide, and would demand than the much vaguer term society. Moreover, they could look to within their own ranks for the esteem and emotional satisfaction that society, which very often wished to have as little to do with its soldiers as possible, would not provide. * * * Soldiers do not serve their society except indirectly; their units do so directly. In this, there is no difference between the Gurkhas and the Foreign Legion cited by Captain Weber, and the U.S. Army during the Indian Wars. The latter was filled with immigrants, ex-Rebels, criminals, disgusted farm boys, all "running" from something. These men served for their own reasons; their units served society. The Foreign Legion and the Gurkhas

both, as units, serve *their* societies.

All the above is not aimless nit-picking. Captain Weber has chosen to define "professionalism" in terms of response to national government and has, in his zeal, structured erroneous information into a wholly unsavory picture of those who do not fall within the purview of that definition. I suggest that he has been overly restrictive and overly eager to accept an all-too-convenient view. * * *

Professionalism, certainly, is more than simply being proficient in one's craft. Along with that proficiency must exist a sense of pride in the practice of that craft, a commitment to a general body of ethics which govern it, sufficient remuneration, and an emotional attachment. That emotional attachment *can be* and, nowadays, most often is, partially made up of national allegiance. But allegiance can be to other causes, other concepts of personal emotional satisfaction. A man is no less professional for fighting under a foreign flag, unless he does so for reasons not in keeping with the generally shared ethics of the profession of arms; that one of those reasons might be that he *is* fighting under a foreign flag is a view limited largely to Americans. * * *

The tenor of Captain Weber's remarks, certainly, is not wholly wrong; and my response is not a paean to mercenaries. By their very nature, they will draw some of the worst in society to their ranks. I feel, however, that Captain Weber has overgeneralized on the nature of mercenaries and has insufficiently reckoned on the responsiveness of *many* mercenaries to the societies they served. And finally, I feel he has, in his enthusiastic promotion of a chauvinistic view of professionalism, consigned centuries of *real* professionals to a semantic limbo.

ROSS S. KELLY

Captain, Infantry

APO, San Francisco 96251

First Battle of the Next War

Dear Sir:

During the last Armor Association meeting, I had my first large-scale confrontation with the theory that the Next War would have only one battle, and that we must win this First Battle. As this theory filters down, it is becoming a conviction, and the opinion is even being voiced that the First Battle will only last an hour.

While the theory and the planning for winning the First Battle of the Next War presents no problem as I see it, the *conviction* that the Next War will consist of only the First Battle is unsettling.

Being a student of history, I have encountered similar convictions held some 60 years ago. The Next War will last only one campaign, modern weapons are too deadly and too expensive for a prolonged war, the Next War will be won more by maneuver than by fighting; all these old convictions have a modernly familiar ring to them, all that is missing today is "Home by Christmas".

The war preceded by these convictions was, of course, World War I. And many of the convictions were accurate. The opening days of the war were ones of violent maneuver, the then modern weapons took a fearful toll of manpower and ate up huge sums of money, and the battle that eventually decided the drift of the war—the Marne—was fought.

By winter, the theories about the Next War's cost were proved all too true. France had 300,000 dead and was almost out of '75' ammunition, the professional British Army died at Ypres, the Germans were exhausted and overextended, and rifle ammunition was short on all sides. By all rights, a negotiated settlement to the war should have followed by spring.

But the war didn't end. France and Belgium weren't about to negotiate with the Germans occupying large portions of their countries; Britain felt herself morally bound to stand by her allies and also wanted time to bring the Royal Navy to bear; the Germans weren't about to relax their harsh terms for peace while they still held the upper hand. So the war went on, through the bloodbaths of the Somme, Verdun and Passchedaele; the years 1915, 1916, and 1917 were years of futility and blood, when millions died for no tactical or strategic advantage.

Theories of the Next War lasting only one battle are all well and good and may well be true, this time. But they just as well may not. I hope that our strategic thinkers are making some provisions for the intransigence of governments as well as military realities, and more importantly, that the chimerical notion of a short war not be passed to fertile imagination.

PETER L. BUNCE

Staff Sergeant

Fort Knox, KY 40121

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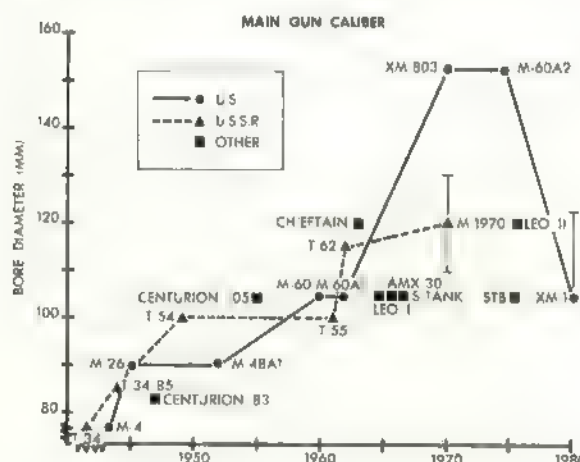
Tank Design: Ours and Theirs



by LTG Donn A. Starry
Former Commandant
U.S. Army Armor School

SUMMARY OF CHARACTERISTICS

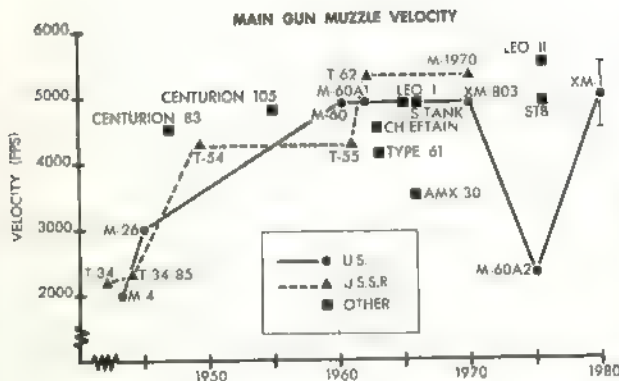
Armament. Every gun design is a compromise between the need for small-diameter, dense, fast-flying kinetic-energy penetrators, and larger-diameter shaped-charge cones. Historically British, Soviet, and German gun designs are best. British fire control is very simple, capable, and apparently reliable. German and American fire control is most complex and somewhat inclined toward over-sophistication. Gun calibers have increased in response to the demand for greater velocities affording better penetration.



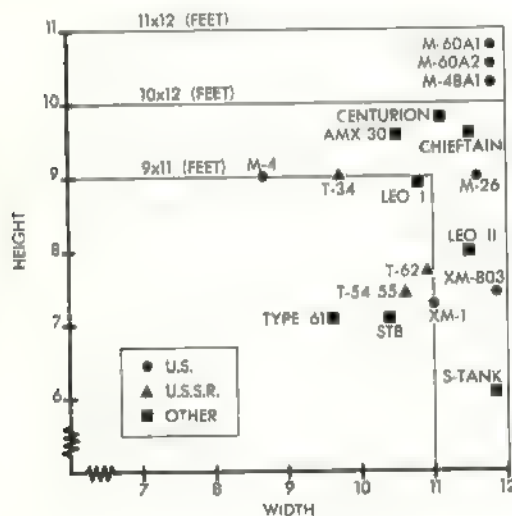
Armor. As better gun-ammunition combinations have developed, armor designers have responded with sloping, hardening, and spacing of armor. It now appears that the shaped charge can penetrate almost any array of cast or rolled homogeneous armor (RHA). However, with special armor now under development, it appears that the shaped charge can be defeated in diameters that can reasonably be fielded in a tank cannon.

Size. Tank size appears not to be an overriding design consideration, except for silhouette. German-

depression buys more protection, but that beyond 10 degrees the marginal return is small. Most tanks other than *T-62* feature depression angles somewhere between *T-62*'s 4 degrees and *M-60*'s 10 degrees.

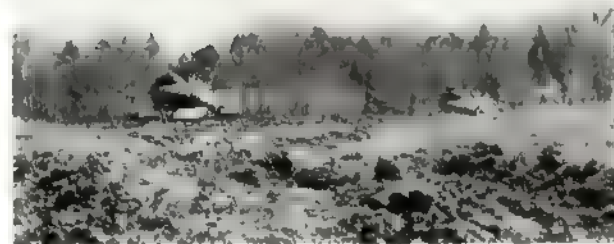


Soviet obsession with low silhouette has been noted. The Berne tunnel criteria along with aircraft and ship-loading limits which reflect the need to deploy U.S. forces from the Continental United States to foreign shores in an emergency have probably constrained U.S. tank design more than any operational consideration. U.S. tanks are still the tallest in the world, as show in this diagram.



Gun Depression. The ability to depress the main gun is important to tank survivability. The Soviet's fixation with low silhouette has apparently persuaded them to accept a small four-degree depression angle in *T-62*. While this may have been good enough in the Ukraine, on more typical terrain, it makes *T-62* expose itself to gain line of fire.

A difference of but 2 degrees in gun depression angle can change the exposed tank area by a factor of four. Studies indicate that up to 10 degrees, more

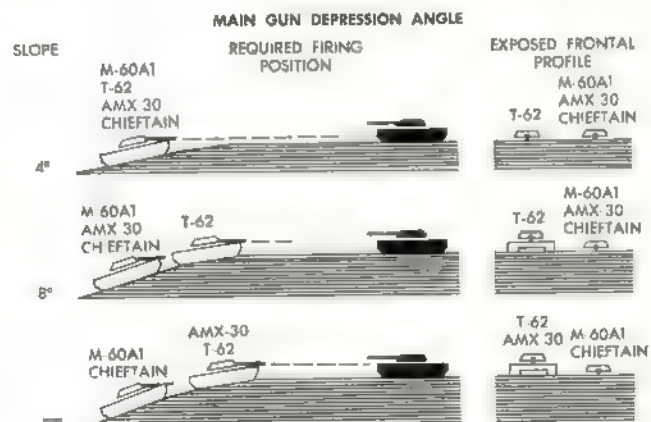


Left Tank
8°

Right Tank
10°

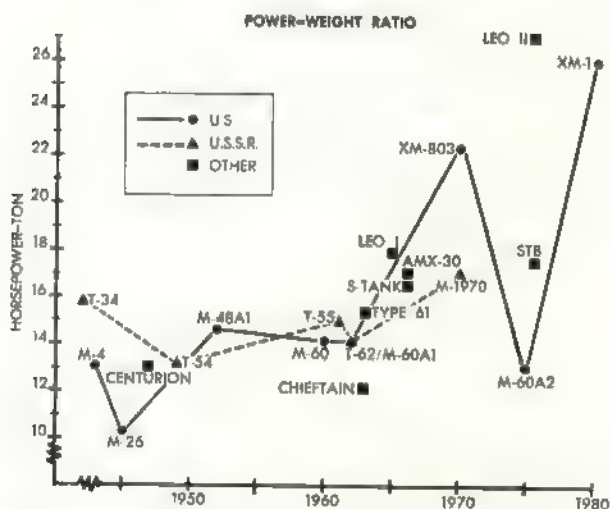
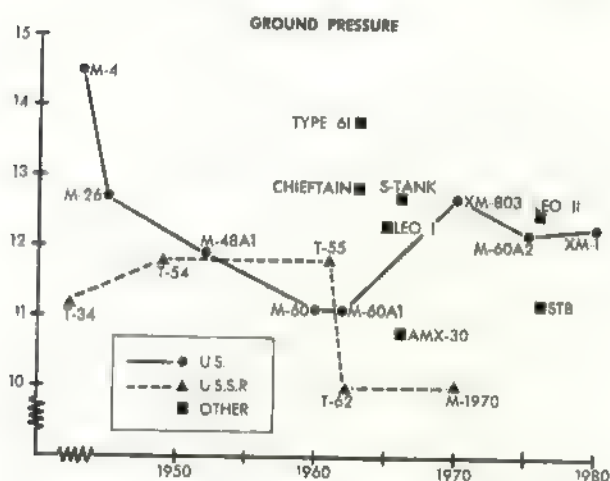
Mobility-Agility. Although engine designers have struggled mightily to meet demands for higher horsepower powerplants generally believed to afford more agility-mobility, gun and armor designers have traditionally been one leap ahead, always just enough weight to offset any added advantages from power increases.

Historically, there has been a presumption that more h.p./ton meant better cross-country speed, and together these spelled greater survivability. As noted earlier, the British apparently have rejected this view, while in other armies it appears still to have considerable influence on tank design. Not until recently have engine capabilities improved much over the 750 h.p. diesel engine in the 1945 German *Tiger*. *T-62* is powered by a 580 h.p. model of the original *T-34* tank engine. German diesel engineers have developed a liquid-cooled military vehicle engine family giving about 125 h.p. per cylinder, a 12-cylinder version powers *Leo II* at 1,800 h.p. American



air-cooled diesel engines, on the other hand, produce more h.p. per cubic inch displacement than any engines in the world. A 1,500 h.p. version powers one *XM-1* prototype.

Ground Pressure. Ground pressure, a function of vehicle weight and track area on the ground, is an oft cited mobility feature. While ground pressure does affect tank going, there appear no significant differentials as between today's firstline tanks. With heavier tanks, lack of power becomes limiting sooner than ground pressure. Similarly, suspension system capabilities tend to become limiting before all usable power can be translated into speed cross country. The charts following provide insights into the several parameters.



While it has long been considered that more engine horsepower, especially h.p./ton and greater speed, gave good cross-country mobility and yielded better survivability, the truth is no one knows for sure how much power gives what speed and agility, and what

CROSS COUNTRY SPEED

Type Suspension	Tank	Speed (MPH)
Torsion Bar	M-48, M-60A1	8-12
	Leopard I	
	T-54/55/62/70	
Hydropneumatic	S-Tank	12-18
	Japanese Type 70	
	XM-803	
Hybrid	Leo II	25-30

these, in turn, contribute to survivability. Work is in progress to find out.

Support. Finally, regardless of operational concepts governing their employment, tanks must be supported in battle. Tank logistics and maintenance in the U.S. and Soviet armies, for example, obviously reflect widely varying concepts.

While they style their tank drivers as driver-mechanics, one look at *T-62* is clear evidence that the Soviets do not expect their tank crews to perform nearly the amount of maintenance U.S. crews must accomplish.

In effect then, the Soviet Army eliminates organizational and DS maintenance. This is consistent with the *Breakthrough* attack philosophy in which succeeding echelons of attacking divisions will pass through disabled and destroyed equipment of leading echelons and continue the attack.

Summing Up

Apparent National Priorities. The summing up of a subject which reflects so many interacting national biases, perceptions, and capabilities is difficult. However, it seems fair to chart apparent tank design priorities of the U.S., U.S.S.R., Germany, and the U.K. 30 years ago and today somewhat as follows:

	1940-45		1975	
U.S.S.R.	Mobility	Gun	Mobility	Armor
U.S.	Mobility	Gun	Survivability (Balance)	
Germany	Mobility	Armor	Survivability (Balance)	
U.K.	Armor	Gun	Gun	Mobility
France	Mobility	Armor	Mobility	Armor
Japan	Mobility	Gun	Survivability (Balance)	
Sweden			Survivability (Size, Mobility, Gun)	

For *Mobility* — read motive power, h.p./ton, ground pressure, road and cross country speed.
 For *Gun* — read range, accuracy at range, lethality, ammunition types and so gun-mount-fire control-ammunition.
 For *Armor* — read strength, hardness, thickness, material, shape, obliquity, silhouette.
 For *Survivability* — read a balance of gun-armor-mobility permitting standoff, surviving a hit, moving to mass forces. The British believe more survivability lies in gun-armor than in mobility. Americans and Germans seek a balance more nearly equal as between gun-armor-mobility. There are differing national perceptions of what factors buy the most survivability.

Apparent Operational Concepts. Priorities summed above have been affected by operational concepts foreseen for tank employment by users in each country.

	1940-45	1975
U.S.S.R.	Combined arms action; overwhelm by numbers.	<i>Breakthrough</i> attack; massed tanks and combined arms action; overwhelm by numbers
U.S.	Tanks are primarily for support of <i>dismounted infantry</i> (1940). attack — speed and Massed combined-arms Violence (1945). Mobilize and win with numbers.	<i>Combined arms employment.</i> Tanks defeat tanks. Tactics to maximize capabilities and minimize vulnerability. Mass to attack or defend.
Germany	<i>Blitzkrieg</i> — Lightning attack with massed combined-arms team.	<i>Massed combined arms action;</i> mass to attack, mass to defend.
U.K.	Some tanks to support infantry. Other tanks for exploitation and reconnaissance.	<i>Combined arms action.</i> Tanks heavily armed and armored to survive and slug it out outnumbered. Fast tanks for recon.
France	Tanks primarily for support of <i>dismounted infantry</i> . Piecemeal deployment of entire fleet.	<i>Combined arms employment.</i> Tanks are primarily to <i>destroy tanks</i> . Fast tanks for recon.
Japan	Tanks primarily for support of <i>dismounted infantry</i> in jungle and island war.	Tanks for defeat of <i>armored vehicles</i> in combined arms action.
Sweden		Tanks for defeat of <i>armored vehicles</i> in defense of Sweden's rugged frontiers. <i>Survive outnumbered.</i>

It is quite clear that Soviet operational concepts have changed but little in 35 years. Numbers win; therefore victory depends on massed combined-arms attack with overwhelming numbers of relatively simple, rugged, less costly armored vehicles.

In America, the mobilization policy persisted long after it was apparent that the U.S. could probably never mobilize sufficient numbers to compete with Soviet numerical superiority. Massive retaliation, as a policy, recognized this anomaly. The obvious bankruptcy of mass nuclear war gave way to the

theory of gradual application of force, or flexible response, in turn bankrupted by the Vietnam War. Combined arms, officially adopted as an operational concept, is still beset by critics and skeptics. Some repeat General MacArthur's cry that tanks get obsolete so quickly one shouldn't buy too many, others seize on each new advance in antitank weaponry to demonstrate the obsolescence of tanks. The idea that sophistication could offset numbers gained acceptance as a rationalization of U.S. inability and unwillingness to support a force structure large enough to make containment a credible strategy.

In England, belatedly embracing the combined-arms idea, clear recognition that Britain could in no way support masses of tanks in a large force structure resulted in consistent emphasis on a few tanks with good long-range guns and good heavy armor, so that British tank crews can standoff, survive, and extract a massive toll of Soviet numbers.

German operational concepts and policies — *Blitzkrieg* — and the Panzer division have changed in 35 years only to the extent necessary to recognize the impossibility of competing with the Soviets on equal terms numerically. Superior tactics, superior training, and continuing efforts to produce a vastly superior tank to survive and win outnumbered all reflect German perceptions of what the Bundeswehr must do to defend the Federal Republic.

France, from her British and American allies, as well as her German enemy, learned the value of combined-arms action. Severely constrained in force structure and alienated from NATO, French tank developers have turned to a system optimized to defeat Soviet tanks in combined-arms action in defense of the *métropole*. Like Japan and Sweden, with national policy focused on homeland defense; armament was designed for that purpose.

To Build a Tank — or Who Does What Well. We have seen how action and reaction have gradually increased weight, gun size, armor protection, and motive power. Some observers claim that tank design is converging, that soon all tanks will look alike. However, one might also conclude that more than tank design itself is converging, what converges is sets of operational concepts for tank employment. Tanks of nations who espouse combined-arms action, and believe that one must mass to attack or defend share certain common characteristics — U.S., U.S.S.R., F.R.G. Tanks of nations whose major concern is solely for defense of their own frontiers share many common features — Sweden, Japan, France. Tanks of nations whose designers conclude

gun and armor outpoint mobility share common features — Britain.

All this may be altered somewhat by the fact that some countries do some things better than other things or countries, and so have led the way in advancing operational concepts and tank design. A few highlights concerning who first developed the idea or fielded the design:

	Operational Concept	Design Feature
U.S.S.R.	Breakthrough Combined Arms Numbers win	Excellent guns Christie suspension Reliable diesel power
U.S.		High HP air cooled gasoline and diesel engines Torsion bar suspension Automatic transmissions
Germany	Blitzkrieg Panzer — combined arms action	Excellent guns Excellent liquid cooled diesel engine
U.K.		Superb guns Excellent armor Stabilized turrets Excellent fire control
France		Optimized shaped charge round
Japan		Hydropneumatic suspen- sion Excellent air cooled diesel engine
Sweden		Turretless tank Sprint power plant Excellent fire control

Decisions, Decisions — or How Tanks Are Designed. The materiel acquisition process in each country is unique, reflecting national character, industrial ability and design genius.

Charting a comparison just between U.S. and

Soviet development systems, several characteristic features can be highlighted.

In the U.S., there are not the autonomous tank development groups noted earlier in tank development systems of some other countries. Responsibility for and design of componentry is widely fragmented and compartmented in subordinate commands of the Army Materiel Command. The competitive development system used since the 1962 Army reorganization virtually insures that every design begins anew, with no assurance of commonality, standardization, simplicity, or trainability. Before 1962, the Army Ordnance Department was responsible for tank design. Users had no control over and little voice in the development process, a condition the 1962 reorganization did nothing to correct. On the other hand, there were always as many user opinions about tank designs as there were users, usually based on nothing more objective than personal bias. Not only could the Commander at Fort Knox, ostensibly responsible for developing user requirements for tank design, not pull together this variegated body of opinion, but a traditionally short tenure of incumbents in that office for the last 35 years has virtually insured no institutional memory, and therefore no consistent user viewpoint about tank design.

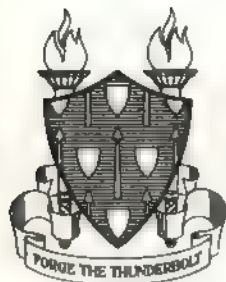
In the United States, it is often said that no one is in charge. The truth is that so many people are in charge that it is difficult to get anything done. The user cannot speak with a consistent voice. The host of development groups, also operating with no consistent voice, under AMC (now known as the United States Materiel Development and Readiness Command (DARCOM)), tend to dominate the user. Since these groups have no single head, development is fragmented, duplicatory, and frequently done in isolation from the user. And more specifically, it is done virtually without reference to whatever operational concepts the user may have had in mind for employment of the fielded system.



EDITOR'S NOTE: *This is the fourth and concluding installment of the series, Tank Design: Ours and Theirs.*

CHARACTERISTICS OF TANK R & D

U.S.S.R.	U.S.
Autonomous Group user-developer	Fragmented No consistent authoritative user voice Responsibility and authority not clear Inadequate prototyping and troop testing
Reward and Punishment motivation	Competitive development
Extensive prototyping	Developer dominated
Extensive troop tests of prototypes	
Evolutionary change by production improvement	



FORGING THE THUNDERBOLT

UPDATE: TRACK VEHICLE MECHANIC

The new track vehicle mechanic (TVM) course recently initiated by the Armor School is 11½ weeks in duration and includes instruction in both wheel and track vehicle organizational maintenance.

TVM students, including members of the National Guard, enlisted Reserve, and Regular Army, come directly from basic training. They must have motor maintenance aptitude area (MM) scores of at least 90, and must fulfill all course prerequisites. During the initial orientation, the student receives a thorough overview of the course, including a tour of the training facility, a reading test, and personal interview designed to determine his personal motivation and qualifications for TVM training. The purpose of this orientation phase is to screen all incoming students prior to course initiation. Since October 1974, over 100 entering TVM students have been eliminated from the TVM course before the training cycle started, accounting for the steady improvement in the quality of the TVM course graduates reported by field commanders to the Armor School in the past year.

Successful applicants for the course begin their formal training with classes in shop safety, maintenance publications, and The Army Maintenance Management System (TAMMS). Following this classroom work, all students move into the field for wheeled and tracked vehicle driver training. This 13-hour block of instruction consists of driver testing and actual driving of the *M-151* jeep, 2½-ton truck, *M-113A1* personnel carrier and the *M-60* tank. This driver training serves only as a familiarization and does not qualify the student for a license.

With this basic background under his belt, the TVM student begins a demanding program of instruction that requires much personal effort and motivation for successful completion. For the next 4 weeks, he learns basic engine principles, basic electricity, and how to use all electrical test equip-

ment found at the organizational maintenance level. He also learns how to troubleshoot carbureted, gas-injected, and compression-ignition engines. This phase of the instruction separates the professionals from the "shade tree" mechanics.

During each phase of instruction, the student must satisfactorily complete practical exercises and personal examinations before advancing to the next phase. Students experiencing academic difficulty are either released from the training or recycled for another try, according to each individual situation.

The TVM student next moves into wheeled vehicle power trains and chassis components and performs a semi-annual preventive maintenance service on an *M-151*. His instruction during this phase also includes performing organizational maintenance services on an *M-35A2* 2½-ton truck, *M-54* 5-ton truck, *M-520 GOER*, and an *M-561 Gama Goat*. A block of instruction on troubleshooting the *M-151A1/A2* automotive systems completes the wheeled phase of instruction.

Expansion of the TVM's tracked vehicle background and expertise is accomplished with instruction in the closed-breech scavenger system, transmissions, controlled differentials, tracks, road wheels, shock absorbers, torsion bars, and final drives. To round out his tracked vehicle instruction, the TVM also learns how to perform his organizational maintenance responsibilities on the *M-113A1* transmission and power transfer, hull, mechanically controlled differential, and final drive components.

In the final stage of the TVM instruction, the student performs a quarterly service on an *M-113A1* APC and an *M-60A1* tank. He also receives further training in organizational maintenance of recovery vehicles, including the troubleshooting and servicing of the hydraulic boom, winch, and hoist components of the *M-88* tracked recovery vehicle, *M-543* and *M-553* wrecker trucks, and *M-578* light recovery vehicle.

To further improve the effectiveness of the TVM course, the Automotive Department identifies partic-

ularly qualified and motivated students early in the course and places them in an accelerated training program to enable them to gain maximum learning and experience from the course. This program is not a "watered down" version of the course, but one that covers the regular instruction in greater detail in a shorter period of time. Accelerated TVM students are selected in the third week of training by their instructors based on class performance and personal qualifications. These students (usually one group of five students per class) proceed independently from the regular course, receiving their instruction from a top instructor in each instructional phase. This program has produced over 600 graduates since June 1973 and its expansion is planned by the Automotive Department for the near future.

The Armor School is also currently investigating the possibility of self-paced TVM instruction that uses modern instructional technology and techniques, and supplementing regular course material with TV cassette tapes, self-tutor texts, and other supporting materials.

INTERVISIBILITY

How many times during tank gunnery training have gunners and tank commanders been told to insure when negotiating a crew qualification course that they announce "target obscured" if smoke or dust obscures the target, so the crew examiner will stop his timing of the target engagement? Unfortunately, there is no stopping the stopwatch on the battlefield. Time continues to run and the enemy continues to maneuver against you. Obscuration of the target by smoke or dust can cause a tank crew to lose its ability to sense a round. Obstructions between a tank and the enemy can cause the round to be deflected or detonated prematurely. No matter what the season, trees, grass, brush, and other vegetation, as well as terrain features, are going to compound the difficulty a crew will have in engaging stationary and moving targets.

During recent tank testing at Fort Knox, gun-camera films were taken of engagements between *M-60A1* and *M-60A1E3* tanks and various types of moving targets. Target runs, designed to present realistic moving tactical vehicles turning, accelerating, and using terrain features, were used for engage-

ments during offensive and defensive quasi-combat operations. This study, using 90 gun-camera engagements, revealed some very significant facts concerning intervisibility and its effect on tank gunnery.

In some instances, the target was visible and detected, but moved behind some obstruction before the gunner could fire a round. At other times, a target would appear from behind an obstruction, then disappear again before it could be fired upon. However, the most significant situation occurred when the crew attempted to engage a moving target as it moved into a wooded area, or behind a small hill. When the gunner took up the proper lead on the target, his point of aim was in the trees, or the side of a hill, even though the target was momentarily in the clear. In almost one-quarter of all engagements studied, there was some obstruction or obscuration of the target. Thus, it was determined by this study that during this type of engagement, over half of the rounds fired would have either detonated before they reached the targets, or would have been deflected enough to be ineffective. These facts make it mandatory that the tank commander consider more fully the type of round to be fired if the possibility exists that the round would encounter an obstruction before it reaches the intended point of impact.

There will be no target effect if the obstruction is a terrain feature; however, if the obstruction is trees or brush, target effect depends on the density of the trees and the type of round fired. Since *APDS* ammunition is more likely to penetrate light obstructions than *HEP* or *HEAT*, the tank commander may elect to fire *APDS* at an obstructed target, rather than *HEAT* or *HEP*. However, he may choose not to engage and give away his position by firing an ineffective round.

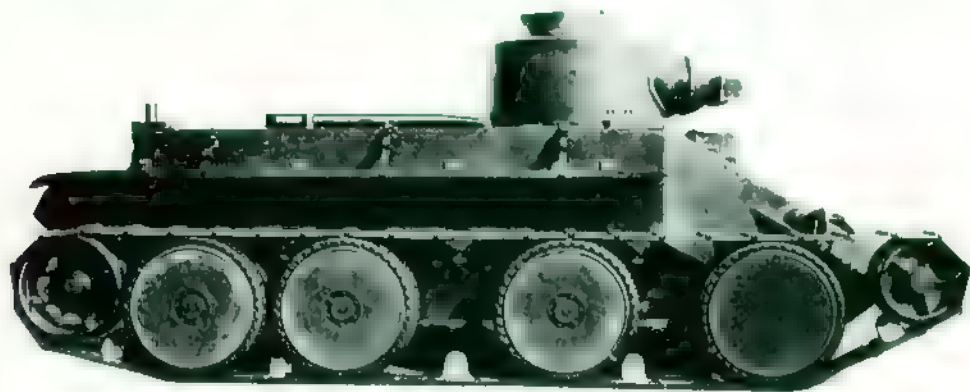
Another situation in which intervisibility will be affected is found on the tank qualification course and the battlefield—smoke from the round fired, dirt and dust kicked up at the firing tank or target, or smoke near the target vehicle.

Overall, crews can expect to encounter some obscuration or obstruction during one out of every three engagements. Obscurations may take the form of smoke or dust, or vegetation or terrain.

Intervisibility, or loss of it, will have a dramatic effect on the ability of a crew to destroy enemy targets. This fact must be brought to the attention of tank crews during training. It can mean the difference between being a flaming hulk, or continuing to announce "GUNNER, *HEAT*, TANK, FIRE!"

□

A YANKEE INVENTOR



and the MILITARY ESTABLISHMENT

Almost a half a century ago, an American genius introduced to the world the concept of the tank as we now know it, but his personality thwarted his attempts to sell his ideas to the military bureaucracy of the day.

Article by George F. Hofmann

J. Walter Christie was a self-made mechanical engineer who displayed a remarkable talent for designing armored fighting vehicles. But he had the misfortune during the post-World War I period to come up against a new technical corporate approach in the U.S. military to managing tank designs and construction. The Christie-Army Ordnance Department relationship represented a conflict between a stubborn rugged individualist nurtured in the school of empirical application and the emergence of the committee approach to military ordnance development as represented by the Ordnance Department and its staff function — the Technical Staff.

Christie was born on 6 May 1865 at River Edge, New Jersey. During his teens he secured a position at the famous Delamater Iron Works and attended evening classes at Cooper Union, a free school for the working people in New York City. He gained

experience in the theoretical aspects of mechanics, and, after leaving Delamater, became a consulting engineer of sorts for several steamship lines. After the Spanish-American War, he patented a ring-turning lathe that provided a stronger turret track for naval guns. During the same period, he also promoted his own design of a front-wheel-drive car, which he raced at various speedways in the U.S., in addition to competing for the Vanderbilt Cup and the Grand Prix in France. In 1916 he entered the military ordnance field with a prototype four-wheel gun carriage.

Christie's contributions to mobile warfare met with considerable opposition. His armored fighting vehicles were considered and evaluated in the United States from 1916 to 1942, but were never adopted. Instead, his designs were introduced and used by Russia and England in the 1930's and 1940's. In World War II, the Russians and British confronted the Germans with thousands of tanks employing Christie's designs. The United States, and especially the Army Ordnance Department, has been criticized for not adopting Christie's tanks. Even today, some confusion exists regarding Christie's contribution to military fighting vehicles. The purpose of this essay is to examine the causes that led to the rejection of

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Christie's tanks and to place them in historical perspective by assessing the relationship between a brilliant tank designer and the emerging corporate structure of the U.S. Army Ordnance Department.

Between 1916 and 1924, 15 armored fighting vehicles designed and built by Christie were tested by the Ordnance Department, Infantry, and Field and Coast Artillery. Not one of the Christie vehicles tested by the using arms concerned and the Ordnance Department received a satisfactory report. In fact, Major General Clarence C. Williams, the Chief of Ordnance, condemned Christie's company for the work it conducted on the Ordnance vehicles. Christie informed General Williams that he had made a profit of about \$175,000 and considered it "blood money," but would repay it by continued development work at his own expense. Christie kept his word; during the fall of 1928 he introduced the first model of a high-speed tank chassis which in the years to follow had a greater impact on tank designs than did his earlier models and caused one of the great controversies over weapons development during the inter-war years.

The *M-1928* high-speed tank chassis was the product of 5 years of development and, according to Christie, cost almost \$382,000. The vehicle was also referred to as the new Christie "Model 1940," because it was considered 10 years ahead of its time. Christie, as in his earlier models, retained the convertible principle — that is, the ability of the vehicle to use wheels on the road and tracks when moving across country. The most innovative feature, one which enhanced the speed and provided a stable gun platform, was the suspension system employed in the *M-1928*. The pilot model used four large weight-bearing wheels on each side of the chassis, each with dual rubber tires and mounted on a pivoted arm which bore a long adjustable coil spring. The large helical railroad springs were positioned between two vertical plates on each side of the chassis, but this arrangement had the effect of limiting the space inside the chassis. The vehicle had an individual suspension spring assembly for each road wheel.

Christie's unofficial demonstration of the *M-1928* at Fort Myer in October 1928 impressed the Chief of Staff of the Army, General Charles P. Summerall, who verbally ordered the Infantry Tank Board to test the vehicle. The tests, which were conducted at Christie's expense, proved less than satisfactory, causing the vehicle to be returned to the factory a number of times for repairs and modifications.

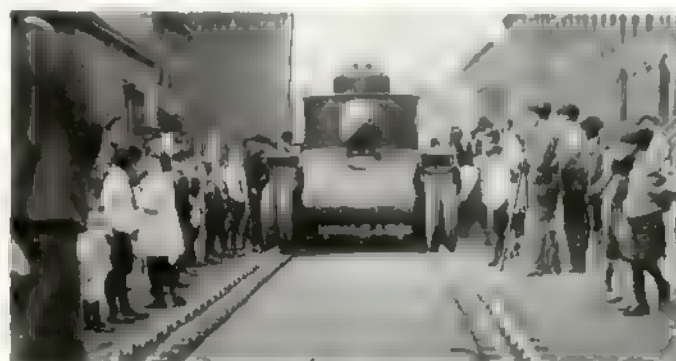
On 22 August the Tank Board recommended to

the Chief of Infantry to adopt as standard as to type the Christie tank chassis and to include the vehicle in the current production program for manufacture. But Infantry and Cavalry enthusiasm for the Christie vehicle was questioned by the Ordnance Department because they did not have the opportunity to test the vehicle and, as a result, Ordnance criticized the Tank Board Report as containing too many inconsistencies.

The display and test of the new Christie vehicle occurred at a time when the Cavalry was seriously evaluating armored cars and considering the incorporation of an infantry tank platoon for duty with the 1st Cavalry Division.

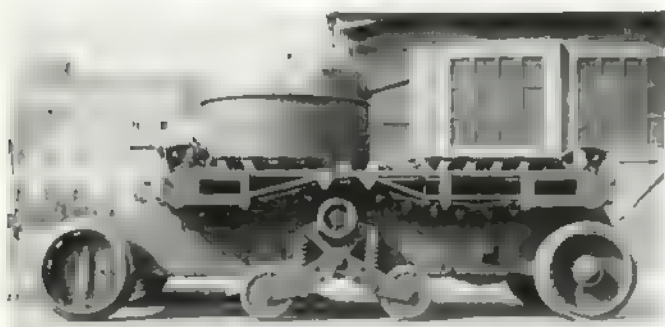
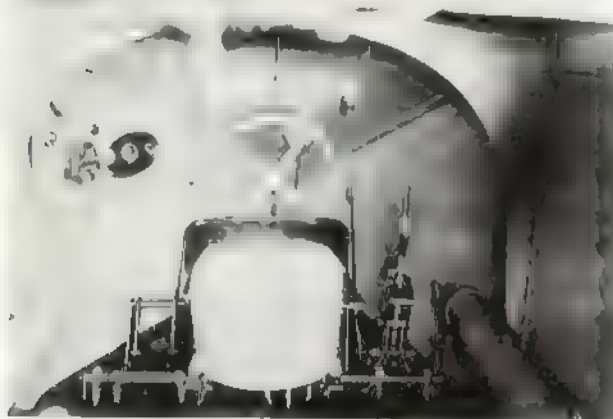
Major C. C. Benson, a cavalry officer assigned to the Historical Section, General Staff, enthusiastically endorsed the Christie vehicle as having "the agility of a wildcat." Major Benson maintained that the Christie vehicle was naturally akin to cavalry doctrine built on mobility, firepower, and shock. For exploitation, pursuit, and raids, the *M-1928* would provide valuable service for the Cavalry.

During the period when the Ordnance Department was negotiating to purchase the *M-1928* for possible



use with the Cavalry, the Infantry outlined a new plan to purchase a number of Christie tanks, due to the efforts of Major General Stephen Fuqua, the new Chief. General Fuqua agreed with General Williams that the \$250,000 appropriated for the *T-1E2* light tanks should be used instead to purchase the Christie vehicle. In December 1929, the Chief of Infantry formally recommended that the \$250,000 appropriated for the procurement of light tanks during the FY 1931 be used to purchase five or six armored Christie vehicles equipped as tanks. In March 1930, circular proposals were mailed, and 2 months later when the bids were opened, Christie's corporation emerged as the only bidder.

A new direction in the Christie affair occurred when the newly designated Chief of Ordnance, Major General Samuel Hof, opposed the purchase of the Christie tanks. He felt that it was the Ordnance



Department's policy, and practice, to procure and test one model, and then buy additional tanks if the test proved satisfactory and defects were corrected. Another factor that irritated the Ordnance Department was that infantry and cavalry representatives had been given the opportunity to test the *M-1928* over the Ordnance Department, which was responsible for the technical features of tank designs.

Not only was the Ordnance Department unable to purchase one pilot model from Christie for the Cavalry, it also failed, due to General Hof's objections, to purchase the five or six proposed Christie infantry tanks. On 6 June 1930, Christie was advised that his bids were rejected, and a request was made by Ordnance asking Christie for the price of one tank. For one tank plus manufacturing rights, Christie demanded \$135,000, which Ordnance could not agree upon. On 18 June, Christie attended a

conference with Captain Christmas and Major W. P. Boatwright of the Ordnance Department and reiterated his position, warning the officers that he would bring to bear political pressure if nothing came of the negotiation. Christie also made a significant statement that "he had spies, or agents, who kept him posted on the developments in this situation, in all branches of the military service."

In order to iron out the conflict, General Summerall called a conference on 26 June involving Christie, General Hof, Major Boatwright, Captain Christmas of the Ordnance Department, and a number of Infantry officers including Colonel Harry L. Cooper of the Tank Board. General Hof stated that the Infantry had neither the right nor the ability to comment on the technical features of tank design. The Chief of Staff at this point advised the Ordnance Department and the Infantry to cooperate on the matter of a tank and work out a contract with Christie or the available funds for the purchase of tanks would revert to the Treasury. Finally Christie changed his attitude and signed on 28 June Contract Word 89 with the Ordnance Department which called for the construction of one tank at a cost of \$55,000. An additional \$6,000 was reserved for the test of the Christie tank and \$1,000 was to be used for modification of the Liberty tank engine. On 1 July, \$188,000 of the \$250,000 appropriated for FY 1931 for light tanks reverted to the Treasury because it had not been obligated. Captain Christmas, Christie's critic, was appointed ordnance inspector under Contract Word 89.

Christie agreed to deliver the tank by 1 September, but much to the consternation of the Ordnance Department, he delayed the delivery until 19 January 1931, 4½ months late. This was due in part to a contract Christie signed with the Amtorg Trading Corporation in New York City for the purchase of two tank chassis to be delivered to Russia. Christie signed the contract with the Soviet trading company in August 1930 and completed and delivered the two turretless tank chassis by December 1930, much to the displeasure of the Ordnance Department.

The other factor affecting the delivery of the tank under Contract Word 89 was the confusion over Christie's involvement with the Polish Government, which was then interested in purchasing a Christie vehicle. Early in 1930, the U.S. Military Attache in Warsaw reported to the War Department, Army Chief of Staff, and G2, Soviet and Polish interest in the Christie tank based on viewing the demonstrations of the *M-1928*. The Polish government was

quite concerned over the negotiations between the Soviet purchasing agents in New York and Christie, because the Poles could not understand the U.S. permitting a sale or the sale of the rights for tank manufacture to a nation that the U.S. did not recognize and the Poles considered hostile.

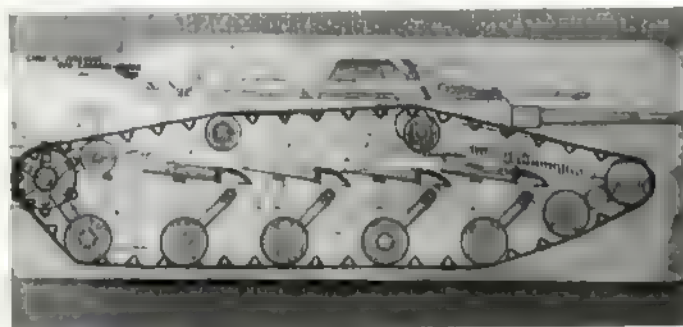
The Christie controversy also had its political ramifications. The *Army and Navy Journal* on 10 January 1931 reported that "the liveliest subject before the War Department Subcommittee of the House Committee on Appropriations for FY 1932 was that of tanks." It was brought to the Subcommittee's attention that one of the problems was the changes in administration of army branches.

While the debate over the Christie tanks continued in the Subcommittee, the Ordnance Department programmed late in January the Christie tank acceptance tests which were scheduled for completion in approximately 1 week. But due to mechanical failures and the inability of the tank to pass all required tests and specifications, the evaluation lasted 6 weeks. Finally, on 6 March 1931, General Hof offered Christie \$54,000 for the tank, plus a complete set of drawings. The War Department Special Board, which was convened to supervise the test of the Christie tank, concurred with the offer made by the Chief of Ordnance, but assurance was given that the contractor would be given an order for additional tanks. In turn, after a considerable amount of correspondence and negotiations, General Hof withdrew his offer on grounds that the Christie tank failed to comply with the contract specifications.

While General Hof was negotiating with Christie, Representative Henry Barbour, Chairman of the Subcommittee, advised the Chief of Staff, General Douglas MacArthur, that it was the intention of Congress that the \$250,000 allocated for tanks in FY 1932 be used to purchase Christie tanks. Representative Barbour further advised the Chief of Staff "that the wishes of Congress, twice expressed in the War Department appropriation bill, will be carried out." General MacArthur, in turn, advised Representative Barbour of the mechanical failures that occurred during the acceptance tests and the dangers of expediting the procurement of additional Christie tanks if the tests were not satisfactory. Christie, in the meantime, demanded that the vehicle be returned to the factory in order to "disconnect every part and correct any weakness discovered." Once the corrections were made, Christie planned to deliver the vehicle for the price of \$54,000 provided he received an order for additional tanks. As it developed, the

Christie tank tested under Contract Word 89 was never purchased by the U.S. government and was returned to the U.S. Wheel Track Layer Corporation.

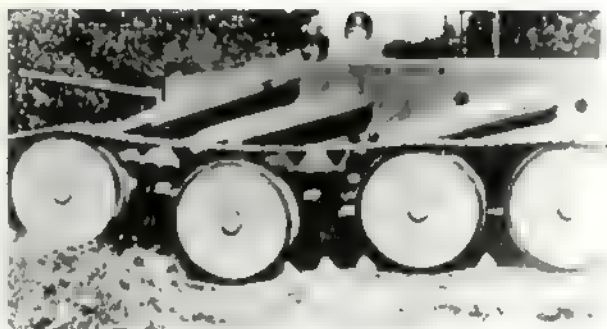
The Ordnance Department felt in general that the Christie convertible tank had demonstrated possibilities. Most of the defects developed in the tests had been corrected, but it was the feeling in Ordnance that the tests had not been sufficient to determine the limitations of the Christie tank. The Infantry continued to push for the purchase of the Christie tank, claiming it met nearly all Infantry requirements for a fast-moving infantry-accompanying convertible tank. Another factor favoring the Infantry's position was the \$250,000 appropriated by Representative Barbour's Subcommittee. On 4 May 1931, a circular proposal was issued for the manufacture of two to seven convertible tanks. A month later two bids were received, one from the U.S. Wheel Track Layer



Christie's last proposal to the Army in 1942

Corporation and the other from Nicholas Straussler of London, England. On 12 June Christie was advised that his corporation had been awarded a contract to manufacture seven tanks at a total cost of \$241,500 (\$34,500 per tank). Between October 1931 and May 1932, the Infantry received three Christie tanks, Medium, T-3; the Cavalry received four tanks, redesignated as *Combat Car T-1*, due to a technicality in the Defense Act of 1920, which placed control of tanks under the Infantry.

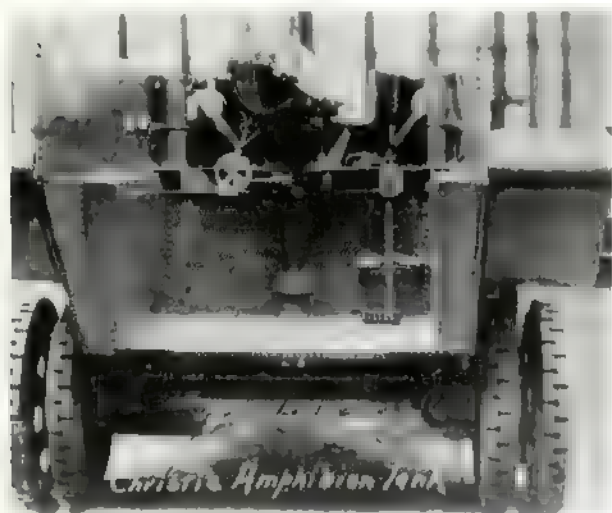
Christie and the Ordnance Department in 1932 reached a position where a working arrangement became impossible. The quarrel between the civilian tank designer and the Ordnance Department centered around future tank specifications, with Christie concentrating on a turretless "Flying Tank" and the Ordnance Department attempting to improve the convertible tank based on Infantry and Cavalry recommendations. Another factor that added confusion to the tank development program was a directive issued by the Chief of Staff in 1931 that the Infantry and Cavalry develop independently their own track-laying vehicle program. This action com-



M-1936

plicated the tank program at a time when the national depression affected military funds. The Ordnance Department in turn was projected into developing track-laying vehicle requirements for the branches that had separate military characteristics, not to mention the controversial debate over the role of tanks.

The Chief of Cavalry early in 1932 outlined the characteristics proposed for the next pilot combat car for the Cavalry, which called for a lightweight vehicle not to exceed 8½ tons (2 tons lighter than the Christie *CC T-1*), enough space for a crew of



Christie Amphibian Tank



four (two more than the *CC T-1*), and an improved turret. Based on the recommendations of the Chief of Cavalry, the Ordnance Department began to develop a new combat car, the *T-4*, for use by the Mechanized Cavalry. This decision was made by the Ordnance Committee, made up of members of the using arms and services, at a conference on the development of convertible combat cars. It was determined to avoid perfecting the Christie system and undertake a development program with the Ordnance Department.

The Cavalry more or less agreed to accept the recommendations of the Ordnance Department, but the Infantry was more adamant. On 18 May, General Fuqua formally requested the standardization of the Christie *Medium Tank T-3*. The Chief of Infantry acknowledged the mechanical failures of the *T-3* but pointed out that they were due primarily to the Liberty engines which were supplied by the Ordnance Department. General Fuqua argued that since 1920 over a million and a half dollars had been spent on the development of tanks, yet the Infantry did not possess a satisfactory track-laying vehicle. In answering the Chief of Infantry's request, General Hof advised the Adjutant General that the Ordnance Committee suggested continued evaluation of the *Medium Tank T-3* and preparation of drawings and specifications for an improved type for consideration "at a future date." The Adjutant General, by order of the Secretary of War, refused the Chief of Infantry's request and advised that "the *Medium Tank T-3* (Christie) is, therefore, designated as a required type, is approved as a development type and is classified as limited procurement type for extended service tests."

Christie, still obsessed with speed and again displaying remarkable inventive ingenuity, wrote General MacArthur of a new 1932 model, which was quite different from the *T-3* and *CC T-1*. Disagreeing with Ordnance Department specifications for tanks, Christie began to develop late in 1931 a new light turretless vehicle made of duralumin and welded steel plates. Christie's new endeavor was greeted in the press as "the culmination of 30 years of inventive genius." The press also reported Christie commenting on foreign agents attempting to acquire the patent and manufacturing rights for the new *M-1932*. These agents, according to Christie, offered him \$650,000 to build his new high-speed tanks.

Christie, through political activity, managed to have the partly completed *M-1932* discussed at the

(continued on page 50)

short! over! lost! OR ... TARGET ⊕

The Reconnaissance Dilemma

by Staff Sergeant Peter L. Bunce

Since before the October War, there has been a lot of study and discussion in the American Army dealing with the threat of massed armor forces and massed artillery. The current solution calls for a heavy covering force for the main body to first engage the enemy, and cause him either to attack elsewhere or launch a breakthrough attack. This is part of how we are to win the first battle of the next war. We must win this first battle, it is argued, because it may well be the only battle of the next war.

The task of providing this covering force has fallen to the Cavalry. The Cavalry platoon will be expected to deceive the enemy into thinking that it is part of the main body, and cause him either to shy away, or launch the breakthrough attack, which is costly in time and material.

The new Cavalry platoon that will implement this covering force will consist of four main battle tanks and five ground scout vehicles (GSV), barely modified mechanized infantry combat vehicles (*MICV*) — fitted with *TOW* systems. It is indeed more powerful than a standard American tank platoon and could well stand up to a threat tank company, even if forced into a knockdown, drag-out fight.

Yet, even with this changed Cavalry platoon, known as the Conceptual Cavalry Platoon, a lot of lip service is being paid to reconnaissance.

Give the commander ample warning of the enemy so he may position his forces, give him reaction time; find the enemy with minimal force, and detect him at maximum distance — these are all sound reconnaissance objectives.

Unfortunately, as versatile as they are, helicopters will not be able to perform reconnaissance for the

commander under all battlefield conditions. There still must be a ground reconnaissance element to fill the gap; there is still a mission for the Cavalry reconnaissance platoon. But the Conceptual Cavalry Platoon cannot fill it.

In the Conceptual Cavalry Platoon, the scout will be fearfully encumbered. Radar sets, mine detectors, demolition kits, 55-pound IR alarms, NBC alarms, laser rangefinders, laser target designators, and intricate and bulky sights are to be supplied the scout, when most scouts want only a good pair of binoculars, a clear night vision device, and some small, quiet vehicle to get them as close as possible to the enemy. Most scouts I know would cheerfully discard 90 percent of the assigned equipment the minute war breaks out, just to be rid of it. The commander, his training time already eaten up by outside requirements, will have the interesting problem of finding the time to train his scouts to use all the new and complicated equipment. The first assembly area of the next war is likely to be littered with piles of discarded bulky, complicated, hard-to-maintain gadgets that no one wants.

Despite being the "best" vehicle to achieve a set of requirements carefully structured by the ARSV Task Force, the Ground Scout Vehicle (GSV) is not a scout vehicle. It is a *MICV*. This wouldn't be so bad if the *MICV* were a vehicle the size of the superbly compact, Soviet-built *BMP*. But it's not. By all reports, its size is closer to that of an *M-60* than it is to that of a *BMP*. Its size is needed because of the load carrying requirement, the load carrying requirement exists because of the equipment the GSV is supposed to carry, the equipment few want. The

five men suggested for the GSV crew is fine, but most scouts I know would accept a four-man crew, even three — we've done it before, in the interests of having a more compact vehicle. Compared to what every other army is using for scout vehicles, the GSV is a bus. Hampered by the sheer bulk of the vehicle, the scout will be forced to dismount more often than he should have to in order to obtain the information he must get, and his reaction time in emergencies will increase because, when dismounted, his flexibility and speed decrease.

Giving the scout a *TOW* is a good idea, but only in the context of the covering force requirement. In all other Cavalry missions, the *TOW* will be a danger to both the scout and his mission. Having a tank-destroying capability presents a terrible temptation, especially when a man sees multiple tank targets in front of him — even if he is supposed to be reporting those tanks rather than fighting them, and many will yield to the temptation. The first *TOW* that leaves the tube destroys the scout's mission, it may even evoke such a reaction as to cause the scout's rapid death.

Reconnaissance is valuable only when it is accurate and up to date. Most threat forces are doctrinely bound to certain timetables and dispositions, and will change them only when given a reason. They may always suspect that they're being scouted, but

suspicious are not enough to change plans. A *TOW* missile crashing into the formation is a reality, and changes will be made. By firing that missile, the scout will invalidate his hard-gained information.

Most experienced scouts want only enough firepower to enable them to engage enemy reconnaissance and security elements should the need arise. Most feel that the light antitank weapon (*LAW*) provides ample antitank protection for the scout because only a desperate situation would prompt a man to take on a tank with a *LAW*, and desperate situations are the only times when scouts should engage tanks.

Finally, there is the contradiction of missions, and the problems of adequately training for both. The covering force requires the scout to function as a tank destroyer; all cavalry missions require him to remain covert, and to fire only in the direst emergency. The two contradictory roles may well confuse the lower-level commander, as well as the scout.

The main objection to the presence of the main battle tank in the Cavalry platoon is summed up in a question from a Cavalry captain currently assigned to the Weapons Department, "If they put the main battle tank in the Cavalry platoon, who is going to support the scouts?"

The current main battle tank, the *M-60A1*, lacks the mobility and stealth necessary to accompany

... in all but covering force missions, the TOW could be a danger to the scout and his mission ...



scouts. The tank is incapable of crossing any significant water obstacle without a class 50 bridge. The squeaking of its tracks can be heard for miles. And it displays a distressing tendency to shed tracks at inopportune times. As an illustration, a friend of mine was driving an *M-60A1* during part of an NCO Basic Course mounted tactical training exercise. With three years' experience driving *Sheridans*, he did not think he might have problems with the tank's tracks and attempted a maneuver easily performed by *Sheridans*: he threw both tracks. It's hardly surprising that the *M-60A1*, designed for firepower and armor protection, is less maneuverable than a *Sheridan*, which was designed for mobility. Most scouts, even as much as some of them dislike the *Sheridan*, will fight to retain the *Sheridan* in the Cavalry platoon when the alternative is to have the main battle tank there.

It is argued that the *XM-1* will have X percent more mobility than the *M-60A1*, so it should be able to keep up with the scouts. But a similar effort applied to a successor to the *Sheridan*, to make it X percent more mobile would yield a vehicle more mobile than the *XM-1* and thus better suited for covering the scouts. Even with its greater cross-country mobility, the *XM-1* will still weigh in excess of 50 tons and will still be unable to cross water obstacles without class 50 bridges. And it is going to be with us for a long, long time. The first *XM-1*'s will go to Armor battalions, not Cavalry squadrons. Cavalry squadrons could conceivably be equipped with *M-60A1*'s until the turn of the century.

What then is the troop commander to do? How are his scouts to be supported? He has, really, only two alternatives. One is that the scouts could support themselves. This would increase the already dangerous inclination to use the scouts' *TOW*'s and would encourage the scouts to drift so far from the tanks that the tanks would not be able to rescue them in an emergency. The troop commander could well end up with just the 12 tanks in his troop, his scouts having been eliminated in obscure little battles far from the rest of the troop.

The other alternative for the troop commander is for him to require the scouts to remain within the supporting range of the tanks. This would lead to having the scouts spend a large portion of their time finding terrain negotiable by tanks. The rest of the time, the scouts would be forced to remain within 2,000 meters of the tanks so they would be adequately covered by the tanks. Thus restricted, they may well be unable to utilize terrain that enemy

reconnaissance units are using. The image of a Cavalry platoon bound to a route suitable for tanks, shadowed by enemy reconnaissance, brings to mind the scene from the old Cavalry movies where the trail-bound Cavalry patrol sees no sign of Indians other than an occasional glimpse of one on a ridge line, until they turn into a box canyon and every Indian in the Western Hemisphere comes screaming down at them.

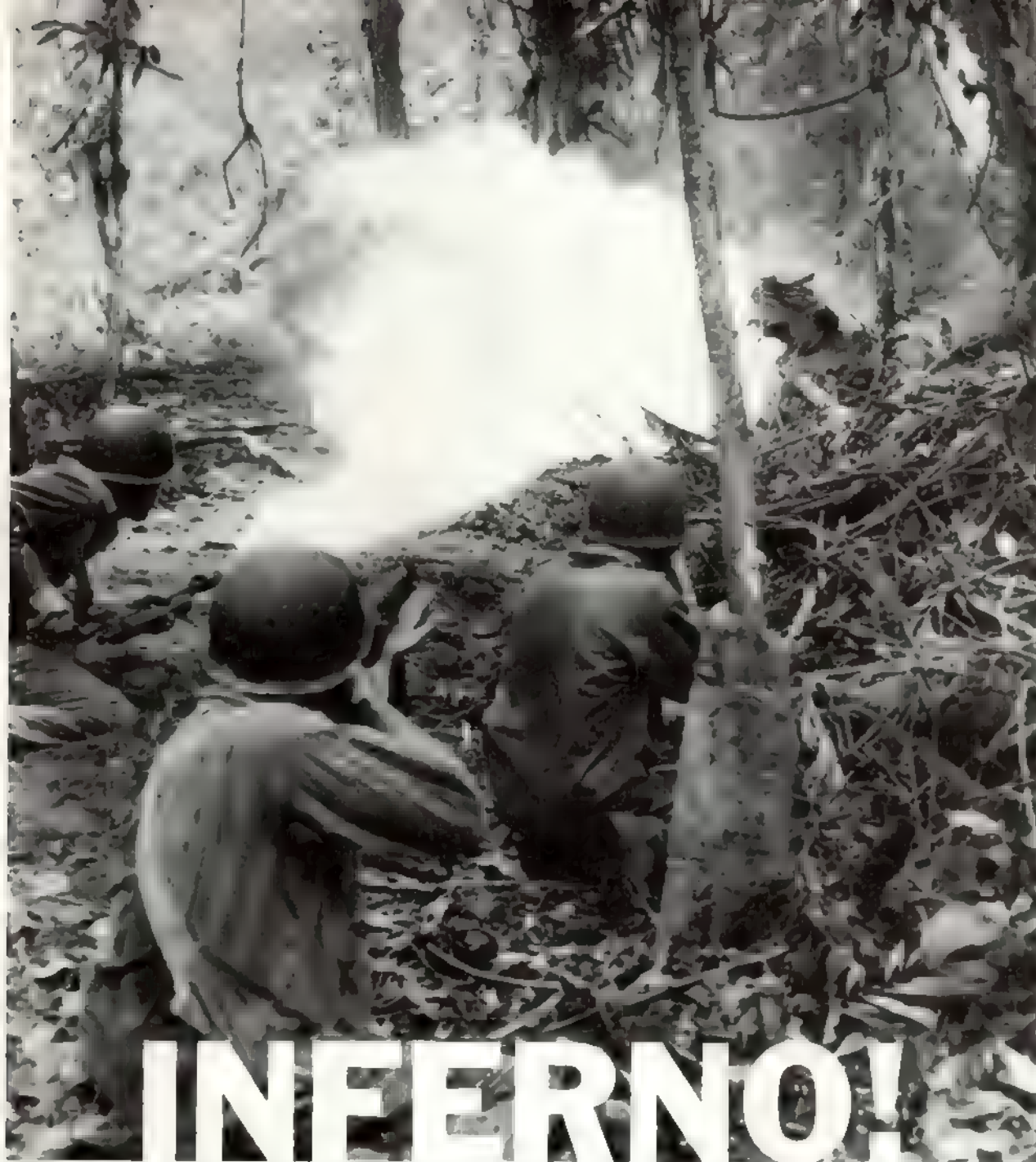
If the Conceptual Cavalry Platoon can't reconnoiter, and the present Cavalry platoon — basically *Sheridans* and gun jeeps — can't slug it out as part of a covering force, what is to be done? Actually, the covering force can be provided from division assets by teaming an armor battalion with a mechanized infantry battalion. Their doctrines already include fighting with the purpose of hurting the enemy as quickly and as severely as possible. Therefore, implementing the new doctrine would not be difficult. The only other alternative would be to raise a new covering force battalion, one or two per division, and not to call them Cavalry.

In either case, the commander needs a light, mobile reconnaissance element. If he is to cover a 40-kilometer front and wants to concentrate 80 percent of his division to counter a breakthrough attack, he is going to need that light reconnaissance unit to screen the uncovered kilometers. If he is to have adequate warning of the enemy's approach and is to remain advised of the enemy's actions after being repulsed, he must have that light, mobile reconnaissance element.

If the commander is to survive on the modern battlefield — both in the sense of remaining the commander of a viable combat unit and in the sense of remaining alive — he must not be blinded. He must retain the light, highly mobile Cavalry reconnaissance squadron.



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INFERNO!

A HISTORY OF AMERICAN FLAMETHROWERS

by Captain John W. Mountcastle

The interesting story of the American flamethrower demonstrates how changes in technology, public opinion, and the world situation can affect weapons development. Additionally, if used as a case history, it shows how ill-prepared the United States Army was to respond to challenges presented by special tactical requirements. In the general field of flame warfare, including air-delivered incendiary bombs as well as flamethrowers for ground troops, the United States lagged far behind other major countries during the period just prior to Pearl Harbor. Thanks to

ingenuity, determination, and raw courage, this country was able to overcome these deficiencies and finished the war with the world's largest complement of flame weapons. Especially on the Pacific battlefronts of World War II, the flamethrower would prove its worth as it saved the lives of countless American fighting men facing a fanatical enemy.

In 1921, the Chief of the U.S. Army's fledgling Chemical Warfare Service wrote a book that served as an unofficial statement of American doctrine concerning chemical warfare. In it, Brigadier General

Amos A. Fries sharply criticized one of the weapons which had been introduced during World War I. He said, "Of the incendiary materials used, the least valuable is the flamethrower. Even the German . . . finally came to using it largely as a means of executing people that he did not want to shoot himself. Men falling into that class were equipped with flamethrowers and sent over the top." Given the attitude of the branch chief, it is readily apparent why the Chemical Warfare Service (CWS) of the 1920's did not have a single flamethrower in its inventory.

World events during the next 30 years would cause American military men to reevaluate the worth of flame weapons. By 1944, another American general would comment on the role of flame. Army Chief of Staff George C. Marshall acclaimed the flamethrower as a weapon which, in his words, "has contributed materially to the successes we have so far attained."

When 20th-century soldiers turned searing gouts of flaming gasoline on their foes, they were making use of one of man's oldest weapons. Warriors have used fire for thousands of years. The bas-reliefs of ancient Assyrians depict the use of burning arrows, pots of boiling oil and naptha in battle. The early Greeks also understood the value of flame as a psychological weapon. Thucydides recorded the use of what was to be called "Greek Fire" in an attack upon the fortified city of Delium in 424 B.C. Refinements in the ingredients of Greek Fire and in methods of employing it continued up until the Crusades, after which time this knowledge seemed to disappear in the murky era known as the Dark Ages.

The first use of what may be regarded as a modern-day flamethrower occurred during World War I. The Germans developed stationary, as well as portable, flamethrowers which utilized pressurized nitrogen to propel a stream of burning oil. The earliest flame projector, the *Flammenwerfer*, was used against French Colonials at Melancourt in February, and against British troops in July, 1915. Both attacks were very successful as French and British troops fled in the face of the roaring flames and clouds of oily black smoke. The French and British quickly recovered from their surprise, and by 1916 had flame projectors of their own. By the time the United States entered the war in 1917, the flame thrower was in use by both sides fighting in the trench-scarred wasteland that was the Western Front.

The U.S. Army experimented with flame projectors, but did not adopt any of these weapons during World War I. With the Allies taking the offensive

in 1918, there seemed little need for a weapon associated with static trench fighting. The few experimental models possessed by the Army were scrapped after the Armistice was signed. With peace restored, the embryonic CWS, under the direction of General Fries, concerned itself with research and development of poisonous gasses and gas defense materials.

Even as the United States maintained its "hands-off" policy regarding flamethrowers, several European powers actively continued their development of these weapons. By the late 1930's, American military attaches were sending confidential reports to the War Department G-2 regarding the impressive flame weapons displayed by Germany and Italy. As war clouds loomed in Europe, Americans followed foreign developments with renewed interest.

During the German *Blitzkrieg* of May 1940, the capabilities of the new flame weapons were dramatically demonstrated. German engineers armed with flamethrowers and demolitions captured the "impregnable" Belgian fortress of Eben Emael in a daring assault that opened the way for German armored columns poised to strike deep into Belgium. Americans were very much impressed by Germany's military success. Before a month had passed, the War Department began to receive requests from various branches for more money with which to develop weapons like those used so successfully by the seemingly invincible Germans.

Among those branches requesting funds were the Engineers and the Armored Force. Both felt that flamethrowers might be worth experimenting with after all. The Army Staff agreed and designated the CWS as the branch responsible for flamethrower development. The CWS was directed to assist the Armored Force Test Board in designing a flame gun that could be mounted in a tank or combat car. In response to the Engineers' request for a portable flamethrower, the War Department told the CWS to design a flamethrower for testing by the Engineer Test Board. It stipulated that the weapon should be man-packed, have a range of at least 10 yards, and use a fuel that was not easily extinguishable. A research and development program for FY 41 was funded somewhat cautiously, the total amount was \$10,000.

With this princely sum in hand, the CWS turned to civilian industry for a prototype of the portable flamethrower. Having disposed of all the World War I models, the Army had to start from scratch. A New York firm, the Kincaid Company, fabricated



Tank from the 713th Armored Flamethrower Battalion on Okinawa, 1945

a bulky test model, dubbed the *E1*. In tests conducted by the Engineer Test Board in the winter of 1940-41, the *E1* fared badly. It was found to be unsuitable on nearly all counts. The CWS and engineers from the Kincaid Company redesigned the weapon and had a second model, the *E1R1*, ready for troop testing in the spring of 1941. The Infantry Test Board conducted the primary tests of the *E1R1* at Fort Benning, GA. Between April and June 1941, the infantrymen gave the new model an exhaustive workout. The final test report indicated that while the weapon was still quite heavy (57 pounds when full of fuel) and needed some minor improvements, it was better than the original design. The *E1R1*, which exceeded the War Department's requirements, was accepted by the War Department in August 1941. The Army had its first standard flamethrower, the *M-1*. Authorization was given to procure 1,000 of these weapons, with the engineer battalions scheduled to receive them first. Infantry protests over being excluded from the initial issue of flamethrowers caused the War Department to increase the number authorized to 5,000, and to designate infantry battalions as recipients of the flame weapons along with engineer units. The Marine Corps, which had watched tests of the flamethrower with growing interest, also ordered a number of the *M-1*'s.

As the United States approached the cataclysmic attack on Pearl Harbor that would catapult her into war, she did so without a mechanized flamethrower. Unlike the successful development of a portable flame weapon, the project to install a flame gun in a tank had failed. During most of 1941, CWS and Armored Force technicians attempted to produce a

flame device suitable for employment in an *M-2* tank. Every test failed and the tankers lost interest in the idea. With tank battles in North Africa then raging, the Americans were more interested in better tank guns than flame devices. This attitude would remain the same throughout World War II. Nearly all of the successful mechanized flamethrowers used by Americans during the war would be produced in the Pacific by those who were to use them in combat.

December 7, 1941 came and America was at war. As the uneven battle for the Philippines developed during early 1942, word was received in CWS headquarters at Edgewood Arsenal that the Japanese were using portable flamethrowers on Bataan. In March 1942, two captured Japanese flamethrowers arrived at Edgewood. The Americans were much impressed by the ignition system on the Japanese weapon, which was far superior to the balky battery-power igniter on the *M-1*. It was copied and incorporated in later models of the American flamethrower.

Pressed by infantrymen for a better weapon, the CWS worked feverishly during the rest of 1942 to upgrade the performance of the *M-1*. The greatest need was for a substance that could be added to gasoline to make it thicker. A more viscous fuel, it was realized, would burn more slowly, thereby delivering more flame on the target instead of burning itself out on its flight to the target. Assisting the CWS in its search for a fuel thickener was a group of eminent civilian scientists and engineers belonging to the National Defense Research Committee (NDRC). In late 1942, a group of NDRC chemists working with Dr. Louis F. Fieser of Harvard produced a combination of aluminum soaps which, when

added to gas, resulted in a sticky substance called napalm.

Although developed primarily as a filling for Air Corps incendiary bombs, napalm demonstrated properties which made it highly suitable for flamethrower fuel. Not only was it easier to direct toward a target than the billowing flame of plain gasoline, but it stuck to what it landed on, and burned with an intense heat. The thickened flame fuel did present a drawback. The hose couplings and fittings on the *M-1* flamethrower were not strong enough to withstand the

the Pacific, the situation was reversed. In all of the Pacific combat areas, the portable flamethrower played an increasingly active role. Dense foliage and canopied jungle made it difficult for artillery to support infantry and the flame gunners often were used in lieu of artillery for neutralizing enemy pillboxes and bunkers. On Guadalcanal, New Georgia, Bougainville, and Tarawa, Japanese and Americans met death at close quarters.

The battle of Tarawa, begun on November 20, 1943, was to prove once and for all that the flamethrower was one of the most important weapons soldiers and Marines had. Reports of the bloody battle contain numerous references to the value of the flamethrower as a means of defeating a dug-in enemy who fought to the death from positions scraped from the living coral. As civilians in the United States began to view newsreel footage of the vicious fighting on Tarawa, some questioned the use of flamethrowers on moral or legal grounds. Burned and blackened Japanese corpses revolted movie-goers who preferred less graphic reminders of what was happening in the Central Pacific. The Army Chief of Staff, General Marshall, responded to the critics by saying, on February 3, 1943, "Vehement protests I am receiving against our use of flamethrowers don't indicate an understanding of the meaning of our dead on Tarawa."

In Europe, Americans, British, and Germans used flame as they battled for possession of fortified cities along the English Channel and the Siegfried Line. In the Pacific, Saipan and Tinian fell with the help of flamethrowers. As American planners prepared to assault the last two stepping-stones leading to Japan itself, they were aware of the very real need for a powerful flamethrower that afforded armor protection for the operators. The South Pacific jungles were left far behind. The upcoming assaults would be over more open terrain that would afford Japanese defenders excellent fields of fire. A GI with a flamethrower on his back would not stand much of a chance. The call went out for a flame-throwing tank. Answering the challenge was a polyglot crew of CWS soldiers, Marines, and Navy Seabees.

Working around the clock in late 1944, this group succeeded in fabricating a very effective flamethrower which was mounted in the gun tube of the standard *M-4* medium tank. Tanks of this type participated in the Iwo Jima invasion in November 1944, and were so successful that many more were requested by the Marine Corps for the upcoming Okinawa campaign. The Army, too, wanted flame

added pressure necessary to propel the heavier fuel. Using the *M-1* as the basis for a new, stronger model, the CWS and NDRC developed the *M-1A1*, which was to be the mainstay of the combat forces until the advent of the still further improved *M2-2*, introduced in late 1944. The *M-1A1* was to prove itself during 1943. In the right hands, it was a deadly weapon.

During 1943, the flamethrower was to become less of a novelty in the minds of combat soldiers and was generally accepted as one of the infantry's standard offensive weapons. Although the flamethrower was carried by troops in the North African and Mediterranean campaigns, a combination of mobile warfare and the ready availability of large-caliber weapons for reduction of enemy obstacles limited its use. In



tanks. A medium tank battalion was converted completely to flame and performed magnificently on Okinawa. The 713th Armored Flamethrower Battalion was in combat for 75 days and was credited with killing 4,788 Japanese. Approaching enemy positions in caves and bunkers, the flame tanks threw long (100-yard) jets of flaming napalm at the Japanese. Those who escaped death by burning or suffocation were machinegunned as they ran screaming from their holes.

As the fighting ended on Okinawa, soldiers and Marines readied their flamethrowers for the final assault on Japan itself. The flamethrowers they stockpiled were never used as two totally new weapons exploded over Japan and brought the war to a close. The role of the flamethrower in World War II was over.

In the years since World War II, the Army and Marine Corps have maintained an interest in flame warfare. Both services required that infantrymen be trained to use the portable flamethrower and continued development tests of mechanized flame guns.

The Korean fighting saw the use of flamethrowers, although the rugged terrain hampered their widespread employment. The Marines took 50 flame tanks to Korea and used them during the Inchon invasion, the capture of Seoul in 1950, and in later actions against entrenched North Korean and Chinese troops. Army troops in Korea were equipped with flamethrowers and used them in a variety of roles, even as CS dispensers on one occasion.

During the long period of American involvement in Vietnam, flamethrowers were used by Americans and Vietnamese units as well as by the NVA. U.S. and ARVN APC's mounting flame guns burned away heavy brush and foliage so that infantrymen could better deal with concealed enemy positions. Along the DMZ, NVA troops armed with Soviet-built LPO-50 portable flamethrowers assaulted a Marine fire camp at Langh Vei. Marines retaliated with counterattacks using their standard M-2A1-7 flamethrowers. As a general rule, however, flamethrowers were used little in Vietnam. The elusive enemy, heavy jungle growth, and ready availability of air-delivered napalm combined to relegate flamethrowers to a minor role in that war.

In the past few years, the Army has continued to search for a better portable flame weapon. The recently developed four-barrel flame projector called *Flash* may provide the ground soldier with the efficient weapon he's been looking for. Weighing only 27 pounds, the weapon can fire an encapsulated

flame round at point targets. Accurate up to 200 meters, the *Flash* round explodes on target and burns with a heat even greater than that of napalm. The soldier who fires can feel confidence to a degree unknown by those GI's of 1940 who staggered out to a test range under the weight and bulk of the old



Model *E1*. The great improvements in weapons carried by American troops have not come easily. The sacrifices and determination of countless Americans has brought us to the level of technological advancement we hold today.

Those of us serving today in a small peacetime Army may be able to learn something from this short history of a special weapon. We must strive to provide an atmosphere where imagination and foresight are not stifled by restrictive budgets and short memories. Testing and experimentation with weapons must continue as we build on the past while looking to the future. Crash programs, hard work, and good intentions won't save us once a conflict has started. There won't be time. We must be prepared.



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U.S. Readiness—

What constitutes military readiness for the United States of America? This is a very complex question, with no simple one line answers. However, to establish a point of departure, I offer this unsophisticated definition:

"Military readiness is the ability and willingness of the United States to decisively employ all its available resources in a timely manner with sufficient flexibility to defend and maintain its democratic freedoms and those of its allies against any overt hostile aggression that seeks to undermine or destroy the same."

by Captain John P. Baker

This simple definition is decidedly unilateral because it is limited in application. Any nation to which it can be even loosely applied is handicapped at the outset by denying itself the momentum gained by initiation of the offense, the element of surprise. The every real, though sometimes docile, moral fiber of the free world, particularly America, demands that the United States and its allies bear this disadvantage as a matter of principle. This unalterable but necessary fact, a heavy burden to say the least, must

—Reality or Myth?

be considered when formulating defense planning.

Presently, in terms of size and power, the major government of consequence in the world, whose opposition poses a serious threat to those principles of freedom we so often take for granted, is the U.S.S.R.

This then raises a major fundamental question which must be addressed, carefully considered and responded to, not only by the President, Congress, the Pentagon, and others with decision-making authority and a direct responsibility for protecting us all, but by every citizen whose personal interests and concerns extend unselfishly beyond our own generations to posterity.

Is the United States able and willing to decisively employ all its available resources in a timely manner with sufficient flexibility to defend our democratic freedoms and those of our allies against overt hostile aggression by the U.S.S.R.?

Concerning our willingness, crisis has historically unified our melting pot society in support of worthy causes. When the crisis of military conflict has beset our great nation, our common cause has always been, and should continue to be, the maintenance of our liberties. I have no reservation about predicting that such future emergencies will be responded to with similar praiseworthy vigor.

Of grave concern to me, however, is what I consider to be the erosion of our ability to respond with the flexibility necessary to "stem the tide" of aggression in the form of a full-scale conventional mechanized thrust across the Eurasian land mass against our NATO defenses. I contend that an ever-increasing decline in our ability to respond in conventional means with sufficient intensity is lowering the nuclear threshold and threatening the very way of life we dearly wish to preserve, not only for ourselves, but for all generations to come.

Strategic nuclear forces have served their purpose as a deterrent to large-scale nuclear confrontation with the knowledge of the unacceptable devastation that would be wrought on the opposing forces in the event of their employment, be it in the offensive or our defensive countermeasure of retaliation. It now seems clear that the present parity will, in the foreseeable future, continue to deter any irrational miscalculations which would lead to ill-advised employment of such weapons, resulting in unimaginable consequence to all. This "balance" must be maintained until alternative accommodations can be arranged.

Recent progress toward limiting the growth and restricting the complexity of strategic nuclear weap-

ons in the form of SALT and the Vladivostok Agreement demonstrate the wisdom of the leaders of both the U.S. and the U.S.S.R. I suggest that this "Mexican standoff," in and of itself, poses a no more serious threat to the U.S. now than it did during the years of our unquestioned nuclear superiority and our indulgence in the humanely irresponsible defense doctrine of massive retaliation.

Recent history reminds our potential adversaries that even those nations which have suffered conventional defeats at the hands of the United States and its allies endured no unjustly cruel or inhumane treatment or enslavement as a result of those free world victories. There was no wholesale slaughter of people. After being defeated in World War I, Germany successfully rearmed herself and pulled the world into yet another global conflict in one generation's time. One generation after being defeated in World War II, West Germany, a part of defeated Germany, and Japan rank among the most powerful industrial and economic nations of the world; subsidized by none other than the allied superpower principally responsible for their defeat, the United States of America.

With this knowledge, any Russian contingency plan, which would consider the alternative of initiating massive strategic nuclear strikes against the United States as acceptably preferable to the possibility of a conventional compromise or defeat, borders on insanity. Such action would probably result in no true victors; no tangible gains. Evidence of continued conventional buildups by the U.S.S.R. could suggest that their scenario of a strategic nuclear conflict with the U.S. produced a similar conclusion.

The estimated ground forces of the Soviet Union now approximates 1.8 million men, comprising 166 divisions of various sizes and degrees of readiness. Soviet hardware is estimated to include 40,000 tanks and 7,000 land-based tactical aircraft. Conventional Soviet naval forces presently consist of a submarine force of 265 and a surface combat fleet of approximately 220 vessels. These naval forces are formidable in that over the past decade, the U.S.S.R. has made a concerted effort to modernize its four fleets and can now boast of, on the average, more modern vessels and numerical superiority to the U.S.

The United States has recently reduced its active ground forces to approximately 900,000 men, comprising 16 divisions; 13 Army and 3 Marine. Three more Army divisions are presently being activated. Army National Guard and Army Reserve forces add another eight divisions to this total, but their mobili-

zation requirements versus their present mobilization capabilities seem unrealistic based on practical experience and the contingency mission requirement for rapid reinforcement of our NATO defense forces in Europe.

Existing deployment of forces in Europe and Eastern Asia would appear to "tilt the scales" in favor of the Warsaw Pact nations. The Pact, as a whole, has 58 ready divisions positioned against the Central Region of NATO. It is estimated that they are capable of fielding 80 to 90 divisions in a very short time, perhaps within 30 days. Assigned equipment includes approximately 16,000 tanks, numerically superior to those of NATO by as much as 3 to 1; nearly 2,900 tactical aircraft, a 2 to 1 advantage, and supporting artillery with a 2 to 1 edge in numbers, in addition to a favorable range differential.

These figures and comparisons, however, do not nearly explain, in full, what I perceive as the erosion of our ability or capability for a flexible response. In support of my contentions, I offer the following observations and opinions for consideration.

First, the Soviet division, while only about half as large as our "support-heavy" division, packs almost as much combat power, with its 75/25 combat to support ratio. It is tailored for a short, intensive thrust across Europe.

Second, our forces positioned along the border between West and East Germany are vulnerable to a quick, mechanized punch-through by the Pact.

Third, the only defensive holding action which now seems capable of successfully allowing us time to reinforce our ground forces is the selective employment of tactical nuclear weapons. I consider this reliance on a nuclear response, even a tactical nuclear response, to be a critical shortfall in our planning; the associated imponderables, such as the unknown "limits" of a spontaneously provoked responsive escalation, are unacceptably risky and potentially too costly for all concerned. I believe that this contingency alternative, which would most likely become a reality by default if the Pact were to attack today, is as irresponsibly inflexible as was our reliance, or the facade of reliance, on the Massive Retaliation Doctrine.

Would we as freely war game the initiation of an abrupt employment of nuclear weapons within the confines of the continental U.S.? That question is rhetorical and its answer academic. But the fact of the matter is that the nuclear threshold is lowered by our compromising dependence on this narrow alternative, and the preservation of the land and the

people we seek to defend as an integral part of our own defense, namely our European allies, is at stake!

Fourth, our purported capability for protracted combat would be of little value or consequence if the Russians reached the Rhine in a matter of days.

The question of American ability to sustain and endure protracted combat in Europe is critically important here. Our war reserve stocks have been effectively depleted as a result of our logistical support of Israel in the most recent Arab-Israeli War.

The Soviet navy could threaten our seaborne reinforcement and resupply efforts via the Atlantic, the control of which we have heretofore comfortably

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enjoyed because of naval and air superiority. As in the past, similar control of the Atlantic sealanes would be a necessary prerequisite for the U.S. in order to support any combat efforts in Europe.

Perhaps even more importantly, the Soviet navy might deny us the importation of the raw materials, notably oil, necessary to sustain our industrial output; thus choking our industrial endurance and denying us the ability for maintaining continuous production of war goods of sufficient quality and quantity to logistically support our combat forces. The sealanes are now, and will continue to be for the foreseeable future, the lifelines of America's industrial and military might.

What then must the United States do to reverse this decline of our ability to respond flexibly, raise the nuclear threshold, and improve the deterrent to Communist adventurism in what they might perceive to be the exploitation of our weaknesses?

It is my opinion that our response can and should be the improvement of the conventional capabilities

of the United States armed forces by means of modernization and expansion. I do not offer this solution lightly because it would require sacrifice, particularly by the American taxpayer in the form of increased taxes to provide sufficient appropriations for the necessary military expenditures. It would, however, provide a spur to the economy in the form of increased jobs and increased production, at a time when the growth in demand for services seems to be outpacing that for tangible hard goods.

Measures have been taken to modernize our ground forces deployed in Europe by increasing the ratio of combat to support troops. Perhaps a re-

*"... let us come to
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vised division TOE could be adopted Army-wide to provide the same combat power with a leaner strength, if such revision would not jeopardize our logistical support capabilities.

Expansion of our conventional ground forces to 18-20 Army divisions with an increase in necessary strategic lift capabilities for rapid deployment would provide more options for response to an attack against the U.S. or its allies than are presently available to our political and military leaders.

Priority should be given to allocating a sufficient amount of resources for the modernization and expansion of our naval forces, particularly those vessels necessary to insure the access to the searoutes that are required to support deployed U.S. forces abroad.

Our war reserve stocks in Europe should be replenished with dispatch and the positioning of our ground forces should be studied carefully and, where necessary, forces should be relocated to provide a defense in depth to blunt an armored thrust along probable invasion routes. This will improve our

delaying action capabilities and buy precious time for reinforcement.

The initial mission of tactical aircraft in Europe should be that of close air support of our ground troops until our mobilization can achieve some semblance of parity.

Concerning the mobilization of Army National Guard and Army Reserve units, intensified training with modern equipment, the equipment with which they would be deployed, would greatly increase their mobilization capabilities.

All of these measures and more must be considered and implemented immediately if the United States wishes to retain its ability to respond flexibly to the potential Communist Bloc threat in Europe. Our readiness must be improved and maintained at a high level to deter war of any kind, and, if hostile aggression is thrust upon us, to be able to apply force of sufficient intensity to decisively defeat our enemies.

Former Defense Secretary James R. Schlesinger should be highly commended for his tireless, unabating efforts to alert the Congress of the United States and the American public to the conventional capabilities of the U.S.S.R. and the Warsaw Pact, and the serious threat they pose. In a statement before Congress, he noted, "It is useless for the sheep to pass resolutions in favor of vegetarianism while the wolf remains of a different persuasion."


Let us continue all our efforts to maintain world peace, but let us come to the bargaining table in possession of something with which to bargain; let us negotiate from the ready position, a position of strength.

Considering the complexity and pace at which we experience change in today's technologically advanced world, time is rapidly becoming a luxury of the past; increasingly more precious, and less available.

Wake up America! Lost time is a formidable adversary.



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The tank gunnery training program which made it possible to qualify 100 percent of the crews of my troop began 5 months before gunnery qualification.

My first step, in January, was to appoint myself Officer-in-Charge of the unit's Tank Gunnery Assistance Team (TGAT). I appointed myself to this job not because I was the most knowledgeable or qualified, but because the experience of the previous year had taught me that the commander of the unit is in the best position to influence the training and motivation of the crews.

Next, I selected a five-man TGAT that was composed of the best men available, regardless of rank. For example, one of the members of the TGAT was an acting sergeant who had been high gunner in the troop in the previous year's qualification firing.

Following the selection of the TGAT, each crew member in the gunnery program was given a thorough eye examination. It came as a complete shock to learn that 23 of the 72 men tested needed glasses — a fact that had a direct bearing on the next step, the tentative formation of crews.

Because the troop would be undergoing its annual infantry squad and mortar squad testing during the same time gunnery qualification was going on, the squadron commander limited the unit to 12 crews

for firing the annual Tank Crew Qualification Course (TCQC).

As the unit commander and as OIC of the TGAT, I chose to personally select each of the 12 crews. I did this with one thought in mind — balance. I knew that, if allowed, platoon sergeants would have a tendency to stack their own crews; not from a selfish desire to do better than other crews in their platoons, but because they had less time to work with the crews of their own tanks due to other demands. As a result, each platoon would end up with one or two very weak crews.

My objective was to create 12 equal crews; i.e., weak gunners with strong tank commanders (TC's) and vice versa. I felt that a strong TC would be able to properly organize and motivate a weak crew, while a weaker TC would need a strong crew.

In organizing the crews, advice to assign only those men with general aptitude area test (GT) scores of 90 and above as gunners was ignored. I

Leading an Armored Cavalry Troop of 18 M-551 Sheridans through gunnery tables I-VIII, with a 100-percent crew qualification is no simple task. But it has been done, and this is a first-person account of the experiences of a commander who accomplished the feat.



'We didn't c

felt my judgment, based on daily duty performance, was a better measure of ability than any single Army test. In answer to my platoon leaders' and platoon sergeants' cries of "foul," my answer was, "work harder with what you have."

The first 30 days of the training program which were devoted entirely to vehicle and gunnery basics, were less productive than they should have been. This was due to the ripoff of personnel for Command Drug Alcohol Abuse Counseling (CDAAC), and legal, dental, financial, and medical appointments which took from 40 to 60 percent of those involved in the gunnery training program away from scheduled instruction.

Following completion of a preliminary gunnery exercise and Tables I through III, all gunnery training conducted in our local training area was totally devoted to preparation for the TCQC. At the outset, Range 80 standards for Table VIII were set for all facets of TCQC training. The crews were not given a chance to gradually work up to a certain standard, but were required to meet the highest standard on their first trip through the course. This approach applied qualification pressure at the beginning and kept it there throughout the training program.

Another important training item involved the driver. When the convoy was formed to move to

the local TCQC training area, all drivers' hatches were closed and locked — not to be reopened again until the crews had finished their Table VIII night run. From the first application of the accelerator, the driver was put under Range 80 conditions and kept there.

Our concept for the TCQC was one of *minimum driving and maximum number of target engagements*, i.e., 40 engagements of various types on a 1,000-meter course. I have never seen the benefit of a 3,000-meter course with eight engagements. The short-course technique gives five times the number of repetitions in the same period of time with much less vehicle maintenance requirements.

After the completion of 2 weeks of TCQC training, crew members were swapped between crews for each run through the course for a 1-week period. Although standardization was the overall goal, this technique spread the wealth of those men with extra knowledge and experience throughout the 12 crews. Therefore, if any single crew or crew member had a better way of doing something, we all saw or heard about it. This technique generated enthusiasm and competition among crews.

After approximately 4 weeks of preparation for TCQC, each crew was formed into a Gold team and a Blue team. The Gold Team was the Range 80 crew configuration. The Blue Team saw the driver become the loader, the loader the gunner, the gunner the TC, and the TC the vehicle driver. The Blue Team which made one of every three runs down the course, was expected to do as well as the Gold Crew in all respects. For example, the new loader was expected to clear, disassemble, and assemble the M-219 coax machinegun in 3 minutes or less while on the move and blindfolded. This developed competition, enthusiasm, understanding, and experience. (Troop commanders, have you driven a qualification course at night under blackout marker conditions lately?)

When we left for Grafenwoehr, we had 24 trained crews: 12 crews with every man competent in at least two crew positions. This Gold/Blue Team technique is the best for developing loaders, gunners, and drivers for the positions they will probably advance to next year.

After 6 weeks of TCQC training, the unit was shipped to Grafenwoehr where we adopted our gunnery motto — "*We Didn't Come Just to Qualify.*" As far as we were concerned, qualifying crews was a foregone conclusion — we had come to earn distinguished crew ratings.

come just to qualify

10 (continued)

Our first day on the main gun ranges saw the introduction of more gunnery training innovations, a few of which are listed below:

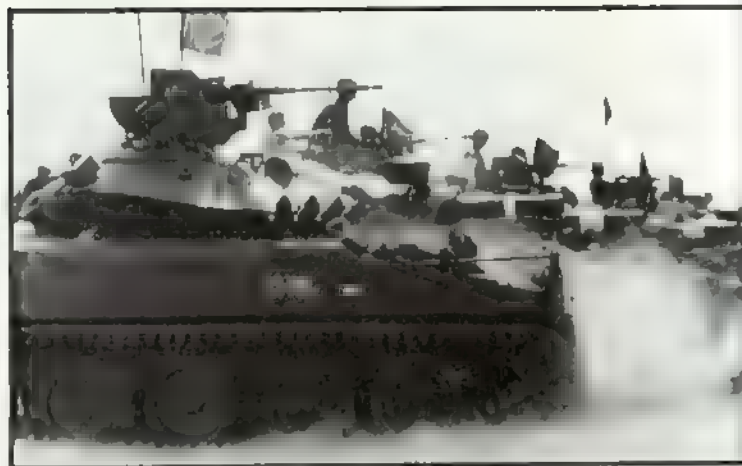
Every main gun round would be fired with an AI on board. The AI's purpose was to:

- Act as Safety NCO aboard each firing vehicle.
- Coach the crew through each firing engagement.
- Critique the crew after each two-round engagement.
- Assist in sensing the rounds fired.

Two tanks on the firing line sensed for the firing tank. The firing tank's sensing was transmitted over the radio, followed by that of each of the sensing tanks, and finally the tower. Each tank, plus the tower, was equipped with a sensing board. These sensing boards displayed a target image over which a numbered and lettered grid of 1/2-inch squares had been superimposed; thus, sensing of J6 meant a lot more to a firing crew than "about 7 o'clock, a little outside the circle."

Every tank on the firing line of a stationary range was plugged into a common communications control point. This was achieved by linking each vehicle's radio control box by wire to a switchboard located in the tower. A radio remote control set rigged to a loudspeaker system was also connected to the switchboard. This system allowed the tower to plug into any conversation on the line at any time, be it radio or intercom. This setup led to some laughs, and even some embarrassing moments for a few crews, but the training value justified the effort. The "private" conversations between crew members while they tried to zero, instantly pointed out the crew that knew the proper procedure and the one that was only guessing. This alone saved many rounds of ammo plus the valuable time of maintenance personnel. Instead of troubleshooting a perfectly good system, we knew instantly to check the "headspace and timing" of the TC or gunner instead. This technique also picked up procedural problems, terminology problems, and even safety violations. It also served as a backup communications system when the inevitable radio problems began appearing. If a crew was having radio trouble, we simply continued firing by using the wire system, then repaired the vehicle's communication equipment after firing was completed.

Each TC was given a headspace and timing gauge and a TC's book. The book consisted of all pocket-sized GTA's pertaining to his equipment and gunnery procedures such as "Prepare to Fire Checks" and "M-19 Telescope and Stadia Reticle." Over half



the book contained sensing pages which depicted a to-scale 10 x 10-foot panel superimposed over a tank silhouette. Each main gun engagement was plotted in the book, using a single page per two-round engagement. An analysis of entries in the book quickly revealed faulty gunner techniques and gave the crew an historical record of its progress and performance. In three instances, the book identified a slipping prism in the sight by displaying a shot pattern that steadily dropped down the face of the target with no change in the gunner's sight picture.

Only 10 x 10-foot half targets were used instead of the prescribed 10 x 20 fat targets. When a TC saw that he was consistently hitting a target half the size of those used on Range 80, he gained confidence in himself, his crew, and his equipment.

Before departing for Grafenwoehr, the unit attended a class on how particular ranges were to be run. During the class, the unit was told who the



officer-in-charge and safety officer would be and were given instruction in the use of the Grafenwoehr and unit SOP's. Thereafter, each man knew his duty on any particular range a minimum of 30 days in advance. This allowed the unit commander to live on the firing line where the action is, not in the tower. Being on the line allows the commander to know the status of each crew's training and proficiency on an hourly/daily basis. The year before I had learned that I could not determine crew status from hearsay or from behind the window of the range tower. By being on the line, I had time to lock in on a weak crew and insure that it received the amount of individual attention it needed to bring it up to the prescribed level.

The troop commander's crew was set up as the one to beat. It was established in the minds of all the crews that to be satisfactory was not enough. Their crew had to be better than the "Old Man's." A crew

had to beat my score, had to have a shorter opening time, had to field-strip the coax quicker, etc. Qualification wasn't the target, the troop commander was. Of course, this technique makes it mandatory for the troop commander to take a tank down range and score well. It is an old, but effective method, *"lead by example."*

One thing I think is important to point out here. It costs a little more to go first class, but the dividends are worth it. First class means fresh paint on all range signs, clean vehicles, fresh haircuts, clean uniforms, visitor's books, and appropriate reporting personnel. With the pride an individual has been building in himself as a crew member, it is only right that his pride overflow to include his equipment and everything around him. This upgrading of appearance and pride reduces the amount of discipline problems; which in turn, allows more time for training.

Some other things that we did at Grafenwoehr to improve our gunnery included the following:

On Table V, the moving target table, two crews were required to engage half-size targets making a single pass across the front. By utilizing 2 separate 10 x 10 panels separated by a 1-foot space instead of the 20-foot fat rat, each of two crews were able to engage the target for two separate firing engagements or a total of 4 rounds per target pass per crew. This procedure is simple to control without any loss of supervision or reduction in safety. The benefits in training are manifold:

- It increases pressure on the crew to hit the target quickly under supervision of an AI.
- Crew interest and motivation remains at a peak.
- One-on-one crew competition is created for both engagements and target hits.
- The procedure builds crew confidence.
- Range time is reduced, permitting increased crew rest and vehicle maintenance.
- Awareness of opening times was enhanced. At this stage in our training, a good crew was getting its first round down range and hitting the target in an opening time of 11-12 seconds. The second round was fired within the first 24 seconds. It is important to note that allowable opening time for Range 80 was 25 seconds. We had two rounds in the target before opening time *cutoff* was reached.

The whole Table V procedure exemplifies our unit motto *"We Didn't Come Just to Qualify."* This *Go-Go* spirit and time pressure were never allowed to ease. I firmly believe that pressure and praise builds

crew confidence and the development of a "Can Do" attitude.

Table VI, on Ranges 34 and 39 were both operated under the *Go-Go* concept, i.e., 28 daylight wet runs and 22 nighttime runs were made down range 34 in a single firing day. This *Go-Go* spirit allowed for more training per limited range period. Additionally, each crew on a wet run had at least two crews behind him on dry runs. (this dry-run policy was also extended to TCQC and Table VII).

The organization for Range 80 was a total troop effort. After work on Range 23 — test firing, zeroing, etc. — was completed, the final objective, Range 80, received all the attention. Listed below are a few of the unit rules we used.

The troop commander has no business in the tower or VIP lounge. His place is on the ammo pad, the ready line, the missile system checkout area, etc. If someone in the VIP lounge wants someone to talk to or to answer questions, let it be the 3d Platoon Leader or unit first sergeant. The commander's place is where it has been since day one — at the point of decision.

All unit assets are employed to defeat the enemy — Table VIII. All turret, track, and radio mechanics are located on the ammunition pads. In the dark when a vehicle commander needs mechanical help, he knows exactly where to find it.

Because of equipment failures, i.e., *XM-44* periscope, IR, it may become necessary for a rapid exchange of equipment for a vehicle coming off the course to one starting down.

The benefits, be they physical or psychological, gained by having maintenance personnel proclaim a vehicle ready to go just prior to loading ammunition speak for themselves.

The troop commander is the last person a crew talks to before going down range. He is there to update the crew on the latest intelligence about range conditions and other crew problem areas, and to offer the men final words of encouragement — "remember, you didn't come all this way just to qualify."

The troop commander is also the first person the crew sees upon their return. As they are walking to the debriefing area, he gets their intelligence input and assures them with, "Good job."

If possible, the troop commander's crew is the first one down range; again leading by example. It won't always be possible because of maintenance problems, and if that is the situation, lead off with the next best you have.

Some other gunnery points I would like to make

involve personnel and age-old myths. Seven soldiers in the troop with the appropriate MOS were not allowed to participate in the gunnery program because of known drug involvement. Fault this as you will, but it insured the dependability of the personnel participating in the qualification firing. When a loader had to suddenly leave for the States on emergency leave in the middle of Table VI, it was an easy job to switch the present vehicle driver to the loader's position (Blue Crew) and add a fully knowledgeable and qualified mortarman who had completed testing in the driver's position.

Another potentially major personnel problem happened on Range 23, the day the crew was supposed to go down Range 80. A loader was injured when struck by a coax cover. Again under the Blue/Gold concept and with permission, it was not a problem to switch a driver from a crew that had completed Table VIII to the loader's position on the new crew with little loss of crew proficiency.

A well zeroed tank is exactly that. The old myth about only being able to fire on "your" tank was destroyed for me forever on Range 80. The high day crew in the squadron had never fired a round in the tank they took down range and scored as a distinguished crew, and exactly the same thing can be said about the squadron's high night crew. "Get in, load it, and GO!"

In summary, let me address the forgotten element in gunnery. All your efforts, all of your organization, all your training, tricks, and techniques will be wasted motion without a superhuman effort from what has to be the most valuable man in the unit — the mechanic. When it comes down to the wire, your unit's tank gunnery success rests in the greasy hands of your overworked and under-appreciated PFC or SP4 on the end of the wrench. We were lucky we had the best in the Army.



CPT ROBERT E. HARRY was commissioned in 1967 as a Distinguished Military Graduate of Murray State University. A graduate of the Armor, Infantry, and Military Intelligence Advanced Courses and Rotary Wing Flight School, he has served in several cavalry units, a Special Forces group and has instructed at the Ranger School, Fort Benning. Captain Harry is currently on his second tour in USAREUR.

MORE BANGS FOR FEWER BUCK\$

by Colonel Robert J. Icks



Almost every country in the world seems to have accepted a similar main battle tank as its basic armored vehicle. One sometimes wonders whether this really has been the result of genuine evolution or is merely the fashion of the moment. What is the magic of a 50 to 60-ton MBT that today could not be matched in basic performance by a well-designed MBT of half that weight?

There would be advantages. In cost alone, it would be possible to produce many more tanks for the same amount of money, especially if a lot of the frills were eliminated. In numbers alone, assuming firepower to be equal, the lighter vehicle would have advantages in mobility, agility, concealment, transportation, supply, and maintenance.

During World War II the decision was made to adopt the *M-4* medium tank instead of the *M-6* heavy tank. Not only did the decision make possible the production of many more tanks, less shipboard space was required to get more of them overseas quickly. There were losses in combat, to be sure, when the *M-4* encountered the bigger German tanks, but the decision was proven correct when the *M-4*'s were upgunned and the Germans were overwhelmed by sheer weight of numbers.

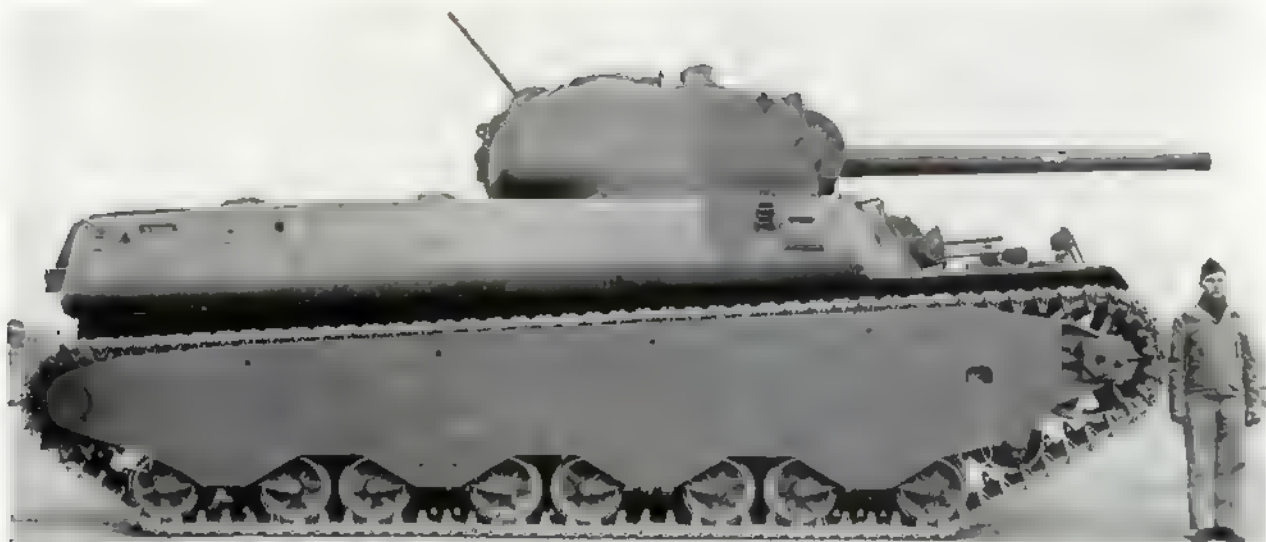
Today, regardless of *detente*, our only potential enemy has the advantage of numbers. The tank is the backbone of Soviet landpower. Estimates vary, but 12,000 is the figure generally accepted, plus 9,000 more in the satellite armies. And the Soviets have demonstrated their ability to cover distances rapidly under combat conditions. One example is their campaign against the Japanese Kwantung Army in World War II. Another more recent one is their move into Czechoslovakia where they now are poised to outflank NATO ground forces.

Their tankers are reminded constantly that they are the elite of all Soviet combat troops. In my book "Famous Tank Battles" (Doubleday & Co., Inc., 1972), I included a quote from *Krasnaya Svyesda*: "Armor is the main combat tool of the land forces. Tanks have shown themselves to be the most appropriate means of functioning under atomic conditions, and they can operate in radioactive areas, cross rivers under water, and shoot by day or night." In the attack, the Soviets use up to 100 armored vehicles per kilometer of front, but always stress the combined-arms concept.

The Soviet *T-62* today is a formidable weapon up to some 1,200 meters. Beyond that, the accuracy of its 100-mm cannon falls off considerably. Because of this, Soviet tanks at longer ranges fire by platoon (3 tanks) at a single target, but try to close to 800 meters or so as rapidly as possible. Battle-sight is used at this range or less because the muzzle velocity is sufficient enough to prevent any appreciable drop in trajectory. At the lesser ranges, tanks fire independently of one another. At any range, Soviet tanks halt to fire.

The new Soviet *T-64* (sometimes called *M-1970*) now being deployed is equipped with a new 122-mm gun with automatic loader, laser rangefinder, and a simple fire control computer, all in a new turret, having none of the shortcomings of the previous dome-like turret; and has a 1,000 h.p. engine. High accuracy is claimed for the new gun up to ranges of 2,000 meters, so Soviet unit tactics may be revised as a result. Thus, both Soviet and Allied armor can be expected to engage at longer ranges. But, in both cases, such fire probably will be effective only in the absence of harassment by aircraft or other means.

In World War I, the progress from light to medium



The M-6 Heavy Tank of 1941

to heavy tanks was rapid. After the war, there was a return to lighter vehicles due in part to economic factors. In World War II, gun calibers gradually increased, necessitating larger and larger tanks. In Germany, this was partly due to Hitler's ego. On the Allied side, it was a matter of continually upgunning to match German development.

After World War II, each major country, and some minor ones, standardized on what has come to be known as the MBT, most of them similar in size, armament and general appearance. Generation I tanks resulted from the final designs of World War II, Generation II represented improvements over Generation I, while Generation III has come about through the experiences gained and the interpretations placed on the comparative showings made by Soviet and Western armor in the Korean, the Indo-Pakistani and the Arab-Israeli conflicts. Generation IV presently is in process of design or construction. Included among these are the U.S. *XM-1* and the Israeli *Tank X*, both big, heavy and low, but the latter apparently is much slower than the former. There also are the *KPz 80* in England, Germany, and Italy, and the Soviet *T-64* already mentioned. The only country to create an entirely different type of MBT is Sweden, where the *Strv 103*, or *S-Tank*, although comparable in size and armament to the other tanks of Generation III, is otherwise innovative.

These new tanks and their immediate predecessors are costly and are becoming more so. The U.S. World War II *M-4* tank unit cost was about \$90,000. The post-war *M-48* initially cost \$210,000. The *M-60* initial unit cost was slightly higher, but subsequent purchase in 1973 had increased to \$297,000.

A year later, because of inflation, the same tank had increased in cost to \$413,000. The *M-60A2* now is armed with the *Shillelagh*, but the Army remains unsure as to how to use the *Shillelagh*-armed vehicle, in spite of the years and the millions of dollars that have been poured into developing that weapon.

The *Shillelagh* originally was intended as a large caliber weapon capable of firing either a missile or a conventional projectile, employing caseless ammunition. It was experimentally mounted on an *M-4* tank and then on an *M-41*, but ended up initially on the *M-551*, and then on the *MBT-70* and the *M-60A1E2*. The *M-551*, or *Sheridan*, originally was intended as an airborne reconnaissance vehicle. The justification for mounting such a weapon on a vehicle that normally would be expected to avoid firefights has never been clear. Or conversely, if it can be justified on a reconnaissance vehicle, were not and are not the *MBT-70* and the *M-60A1E2* under-gunned?

The conventional rounds can be fired when the vehicle is in motion or at a halt. The missile can be fired only at a halt. But a tank that halts to fire should be able to move out immediately after firing. A missile requires keeping the target in sight until it is hit. The two are not compatible because the halted tank is a sitting duck for the 20 seconds or so until the missile reaches its target.

The *MBT-70*, as its name implied, was to be produced by 1970, but the civilian analysts in the Defense Department seem to have evaluated tanks solely as stationary antitank weapons, leading to many of the problems that plagued the program and kept it in the prototype stage.

Congress killed the *MBT-70* program in December 1971 because the unit cost had risen to a million dollars. At that time, some of the self-appointed experts in Congress expressed the belief that "The tank is nearing the end of its combat capability," but the killing really was due to the cost factor. The Desobry Committee then created a new set of specifications, and Chrysler and General Motors built pilots of *XM-1* to meet those specifications. In the meantime, the ecology nuts having closed down all but one of the foundries capable of casting armor hulls and turrets, production needs have caused the "modernizing" of the 20-year old *M-48A3* tanks into *M-48A5*'s, which, if today's standards are valid, will still result in inferior tanks.

The Germans, part of the *MBT-70* program until dropping out in 1970, had not been happy with the *Shillelagh*, so they intended to use a conventional cannon. Their parallel *Leopard* program continued, later models of which have become even more sophisticated. Now another parallel program has begun, this time in collaboration with the British and the Italians, toward a *KPz 80* or 1980, which incidentally is when our *XM-1* is supposed to be ready. Parenthetically, one hopes that *detente* will cause the Soviets to give the West the additional time to meet that deadline as they so obligingly have done until now.

The *Leopard II*, a very fine tank, has a unit cost of about three-quarters of a million dollars. The *Leopard III* now appears to be approaching the million dollar mark just as the *KPz 70 (MBT 70)* did. But one interesting fact appears concerning the *Leopard III*. The hull is lower than the *Leopard II* and several prototype variations are being built. One

The unit cost of the *Leopard III* appears to be approaching the million dollar mark, just as the *MBT 70* did.



has the 120-mm gun in a low split turret, one is similar in design to the Swedish *Strv 103* and a third also is turretless, but the armament is in an armored gun mount.

The British created the *Centurion* near the end of World War II, and carried it through successive *Marks*, but later began the parallel development of the *Chieftain*, from many standpoints the best of the Generation III designs. There has been some criticism in the United States over the use of separate loading ammunition in the *Chieftain* because of the inherent hazard of using powder bags. But the caseless ammunition for the *Shillelagh* presents an equal and similar hazard. As for rapidity of fire, I have seen the *Chieftain* with its 120-mm gun and the *M-60A1* with its 105-mm gun firing a tactical problem against a moving target and there was little, if any, difference in either accuracy or rate of fire between them. There was a noticeable difference in silhouette.

Practically all, if not all, of the newer MBT's are marvelous mechanical monsters. But the more complicated they become, the more difficult it will be to achieve the ideal that every crew member be able to function in every position in the crew. And even if this ideal could be achieved in a peacetime professional army from an operational standpoint, it is doubtful that it will be from a maintenance standpoint. Much of what is included in the modern MBT may be great to have, but is it necessarily essential?

For example: most tanks today are fitted with searchlights of various types, from simple to Xenon and IR. The Israeli's learned that lights are vulnerable, and are not overly enthusiastic about them. Automatic loaders are popular not only because they are labor-saving, but also because they can eliminate one crew member. The *M-60* series, like its predecessors, utilizes a commander's cupola with machine-gun. This adds to the height of the silhouette, but aside from that, does not the tank commander have enough to do without having to keep an eye cocked skyward for enemy aircraft? The Israeli's removed them from the tanks we furnished them.

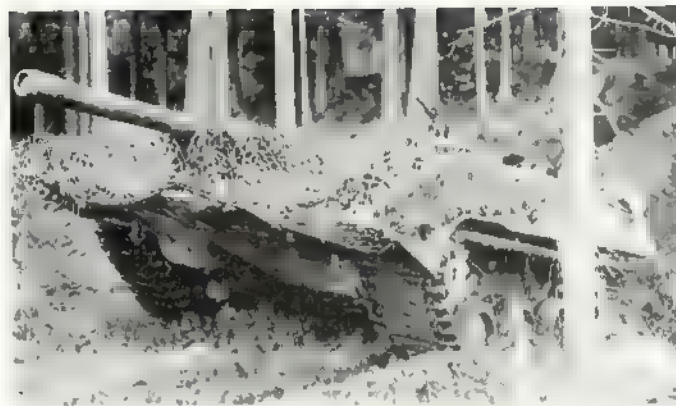
These are only a few of the frills that exist today. If a tank has to have a searchlight, why not provide one like the retractable light on the German *Leopard*, or something like the German *Schimmelpfennig* device, a retractable mirror set at 45 degrees with the light source recessed and pointing upward? A central air filter, or a collector protective system, appears redundant in view of the availability of modern gas masks.

There is a logical reason for a variable suspension system for a tank like the Swedish *Strv 103*, where it is an integral part of the vehicle armament and fire control system. In any other case, it is an expensive and vulnerable frill. Modern fire control equipment takes care of vehicle cant. Nothing else is necessary. An automatic loader is less tiring, but in the longer view, training, security duties, fatigue, maintenance, and battle casualties place a greater burden on the members of the smaller crew of the tank equipped with an automatic loader if the purpose of adopting it is to reduce crew size.

Lasers have come to the fore in the last few years. Experiments are taking place currently to determine whether they have the possibility of providing the Buck Rogers type of death ray, so long the darling of the science fiction set. Yet laser beams function similarly to light rays, and thus are affected by fog, smoke, dust, and clouds, as well as by reflecting surfaces. Every object has a "signature" of some kind, so laser is being used to locate and "paint" targets in order to guide "smart" projectiles to them. Under ideal conditions, this is a formidable weapon, but it is not the perfect weapon because of the shortcomings mentioned.

Missiles are potent weapons and hundreds of them have been developed. They still are not the perfect weapon and they never will be. Dust and snow obscure or stop guidance. Glare, smoke, rain, decoys, other vehicles, the flash of weapon fire, (especially at night) all have an effect on missile accuracy and effectiveness. They require firing from a fixed position and continuous observation for a considerable period. For that reason, mounting one on an MBT is unthinkable. The tank that halts 20 seconds to fire during combat is in trouble. On the other hand, missiles fired as defensive weapons have much in their favor, especially those like the terminally-guided submissile systems dispensed from ground or air. Once released, their sensors slow and stabilize them as they search and scan preparatory to homing on targets such as tanks. But they do not belong on a tank.

It once was a rule of thumb that the armor carried by a tank should be sufficient to stop a projectile equivalent to one fired by the tank's own weapon. This has resulted in thicker and thicker armor, and heavier and heavier chassis as gun calibers increased. Modern developments in sandwich armor of steel and polypropylene layers, or spaced armor, or layers of steel and ceramics, or ribbed steel sandwiched with aluminum plates have helped to lighten vehicles, but



The Swedish *Strv 103* (S-Tank) has a silhouette the height of a man.

have added greatly to cost, and still cannot repel everything thrown against them.

There is nothing in the history of armored vehicles that says a tank must have a turret in order to be a tank. The Swedes proved otherwise in their *Strv 103*. But that tank, as already said, has an integrated steering and suspension system. Main armament mounted on a flat turntable or elevatable mount with automatic loader and remote control properly designed should be able to function as satisfactorily as a turret mounted gun, and has other advantages as well.

Elements of Vulnerability

One of the new words among tankers is "survivability." It is made up of all the elements of mobility, agility, silhouette, slope and quality of armor, and weapon effectiveness. Perhaps it has advantages over the older word "vulnerability," but the older word still is expressive.

Armor protection is intended to reduce vehicle vulnerability, but the vulnerability is not based solely on armor protection. Other elements of vulnerability are flame introduced into engine louvers, ventilator openings, or stowed ammunition; track breakage; and the blinding of vision devices. When it is considered that some modern missiles can penetrate up to 24 inches of armor, and kinetic energy projectiles can penetrate up to 12 inches with relative ease, what can possibly justify attempting to defeat such projectiles? Cost is increased and the mobility and agility of a tank are reduced proportionately as armor thickness is increased. It is impossible to build an armored vehicle that some kind of projectile cannot penetrate. So, except for protection against small arms fire and shell fragments, the see-saw contest between gun caliber/muzzle velocity, and armor

thickness seems worth reexamination.

The second element of vulnerability to fire may bring to mind such things as the Molotov cocktail or a flamethrower. And both require close-in attack. Even the flamethrower of the past had an effective range of only some 75 to 80 meters. But the development in 1969 of conventional rounds that burst into flame on impact have changed that, and has introduced a new element in tank vulnerability to flame. In connection with the element of track breakage, there have been cases in the past when a courageous infantryman has interposed a metal bar between the sprocket and the track, but this is a rarity. Accordion wire can accomplish the same thing, but it is thought of as being laid manually in front of fixed positions, although a mechanized wire-layer was improvised during the Korean War. But there may be another possibility not yet fully explored. A thin-walled casing with proximity fuze and loaded with tightly coiled accordion wire might prove to be an effective projectile for the purpose.

In the fourth area of tank vulnerability, not enough effort has been placed on blinding enemy vehicles, except perhaps for the use of smoke. But smoke obscures the vision of the firer as well. Here again, a thin-walled projectile, this time filled with some viscous fluid such as white paint might serve. Rounds of this type could be provided for antitank guns as well as for 20-mm coaxial tank guns. Either, or both, would smear vision devices with a good hit, blinding the crews of enemy tanks, making possible a turkey shoot. The emphasis on defeating enemy tanks appears to be directed almost entirely against the armor area of tank vulnerability. The other areas also should be exploited.

Except for nuclear weapons, which the West is not likely to be the first to introduce because of harm to friendly populations, NATO never will have all the force it needs. NATO's present limited tank strength, however, need not necessarily be made up of the present large MBT's. The naval deadnought, like the dinosaur, got too big for its own survivability and disappeared. And today, our Navy appears about ready to build many small aircraft carriers instead of any more giant carriers.

Mobile defense needs teams of tanks with accompanying infantry in APC's to be effective. Helicopter gunships, helicopter minelayers, attack aircraft, FAE (fuel air explosive), smart bombs, and artillery shells, as well as missiles of all sizes, also will be involved in defense. All have become more and more complicated and require a high degree of

training. As to tanks in particular, their modern complexity and the relatively small numbers available will cause their crews to be overworked. The resulting fatigue, to say nothing of battle casualties, will greatly and quickly reduce their combat effectiveness.

Our MBT's might better be lightly armored vehicles, of perhaps 25 tons, fast, agile, easily concealed, with low silhouette, and thus, without a turret. The main armament would be similar to that at present and hopefully of the type that fires out of battery. This armament would be mounted on a turntable, or an elevatable mount, such as that provided for the Japanese *SS-11 (Type 60)* self-propelled recoilless rifles. Tanks of this type could be provided in great numbers for the same amount of money now spent on current programs.

At least one of the prototypes of the West German *Leopard III* being built presently represents this idea. Perhaps the model finally adopted will be less complicated, as well as being less expensive, and influence future production in those directions.

At any rate, tanks can and should be cheap and unsophisticated so that they can be available to NATO in greater numbers. Nothing should be included in their design that does not contribute directly to their mission. They cannot be kept simple if they include provisions to meet every possible contingency likely to occur in any and every part of the world.

This concept may sound too simple, and perhaps it is too simple, but it would be easier for us to attain and would seem to have the potential for far greater effectiveness. Thomas Hobbes, the 17th Century British philosopher, once said: "There are two recipes for success in war — force and cunning." If the present overly-complex and overly-expensive MBT continues to be the standard for the West, NATO never will have the force, in tanks at least. The alternative deserves some serious thought.



COL ROBERT J. ICKS, USAR-Retired, was commissioned in Infantry upon graduation from Ripon College in 1927. An enlisted man in World War I and a colonel with the Ordnance Department in World War II, Colonel Icks has been a lifelong student and writer of armor, having authored seven books and numerous articles for professional journals.

Four brave men who do not know each other will not dare to attack a lion. Four less brave, knowing each other well, sure of their reliability, and consequently of mutual aid, will attack resolutely. There is the science of the organization of armies in a nutshell.

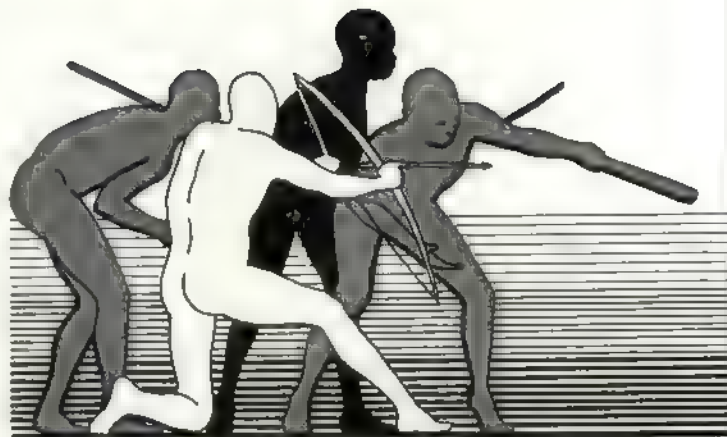
FOUR MEN AND A LION

by Captain John R. Wallace

Because of technical advances in warfare shared by many nations, the theory has been put forth that the ultimate victor in the next war must be the victor of the first battles. We hurriedly retrain our troops with this theory in mind. We revise our tactics and spur the technicians in order to achieve the razor's edge on the modern battlefield. Could it be, however, that we are failing to emphasize the essential factor that determines victory in battle? What enabled Alexander's 40,000 to defeat Darius's half-million; Hannibal's Carthaginians to defeat the legions of Rome, or the Israeli Defense Force (IDF) to defeat armies equivalent in combat power to those of NATO Europe? The answer is not superior tactics or training alone, but certain intangible qualities in their armies created by the cohesion, solidarity, and unity among the combatants.

The human heart, to quote Marshal 'de Saxe, is the starting point in all matters pertaining to war. Future protagonists will most likely be equal in technical advancements. The victor who emerges will be he whose army possesses these intangible qualities to the greatest degree; whose army organization strengthens the unity, solidarity, and cohesion of its combat units. Our army organization fails to provide these qualities to the degree essential for success in modern combat. Thus, we must search for an organization that maximizes the traits of the American soldier: his initiative, his tenacity, his loyalty and his hatred of defeat. Where do we begin?

An identical question was posed in 1865 by Colonel Ardant du Picq when he reflected on the same organizational problem plaguing the French Army of that period. Like Napoleon, du Picq believed that in war the morale element is to all others as three is to one. Du Picq's master treatise, *Battle Studies*, considered by many to be a military classic, explores the effects of ancient and modern battle upon the participants: the men of the phalanx, the legion, and the division. Du Picq's observations



are over 100 years old, but they are simple, universal truths, eloquently stated and entirely modern. First, du Picq observed that:

"Man is capable of but a given quantity of fear. Today one must swallow in five minutes the dose that one took in an hour in Turenne's day. Combat exacts a moral cohesion, a solidarity more compact than ever before."

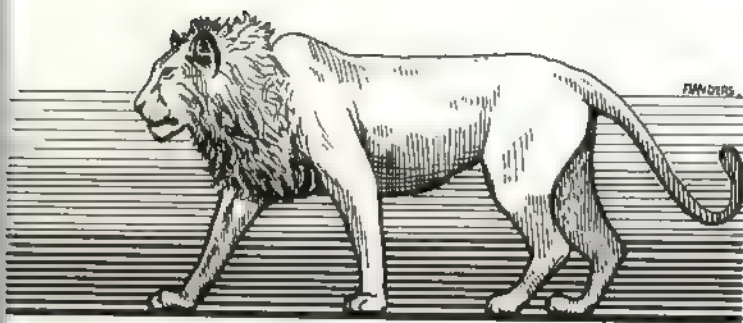
As the pace of war becomes swifter and more violent, there is a greater need for cohesion among combatants. As combatants become more dispersed and isolated, there is a greater need for high morale. Therefore, combat today, in order to achieve the best results, requires a moral cohesion and unity among the combatants more binding than at any other time. As wars become shorter and more intense, the creation of *esprit de corps*, cohesion and unity must be emphasized in advance. These intangibles, this discipline which insures a united effort, is provided by organization. Du Picq does not advocate a model of army organization, but he does prescribe the structure of the organization.

"A wise organization insures that the personnel of combat groups changes as little as possible, so that comrades in peace time maneuvers shall be comrades in war. From living together, and obeying the same chiefs, from commanding the same men, from sharing fatigue and rest, from cooperating among men who quickly understand each other in the execution of war-like movements, may be bred brotherhood, professional knowledge, sentiment, above all unity. The duty of obedience, the right of imposing discipline and the impossibility of escaping from it, would naturally follow.

"And now confidence appears. It is not that enthusiastic and thoughtless confidence of tumultuous or unprepared armies which goes up to the danger point and vanishes rapidly, giving way to a contrary sentiment, which sees treason everywhere. It is that intimate confidence, firm and conscious, which does not forget itself in the heat of action and which alone makes true combatants.

"Unity and confidence cannot be improvised. They alone can create that mutual trust, that feeling of force which gives courage and daring. Unity alone then produces fighters.

"The determining factor, leaving aside generals of genius and luck, is the quality of troops, that is, the organization that best assures their *esprit*, their re-



liability, their confidence, their unity. Troops, in this sense, means soldiers. Soldiers, no matter how well drilled, who are assembled haphazard into companies and battalions will never have, have never had, that entire unity which is born of mutual acquaintanceship."

American officers should recognize the simple truths in du Picq's observations. We should also recognize that our army organization neglects the qualities du Picq insists are essential. The personnel turbulence created in our units by the individual replacement system, the reenlistment program, normal ETS's, and post personnel support requirements disallows any long-term stability. (OPMS? EPMS? Eradication of branches?) As our soldier may serve in several units throughout his career, he is prevented from cultivating long-term friendships and professional bonds. Unit efficiency and esprit are diminished. Although most units are able to overcome the personnel problems and accomplish day-to-day missions, this is a poor standard to measure the ability of the unit to survive on the modern battlefield where fear reigns and death comes unseen.

Now that the organizational problem has been identified, what alternatives can we consider as possible solutions? Dr. David R. Segal, United States Army Research Institute, Behavioral and Social Sciences, observes that there are two models of military organization. The first is the fraternal, the virtues of which were extolled by du Picq and perhaps best exemplified by the British regimental system. The second is the corporate, in which the major link between the soldier and his service becomes the cash nexus, as the communalism of the installation and the fraternalism of the unit decay. The American military, observes Dr. Segal, is drifting from a fraternal to a corporate form of organization, and the corporate model "is not likely to elicit the kind of commitment required to get personnel to risk their lives on fields of battle." This dangerous and unacceptable trend can be reversed by adopting

a fraternal system of organization.

The American Army could develop a strong fraternal organization by adopting a regimental system with the following characteristics:

- Career service and association with a single regiment for enlisted and officer ranks of armor, artillery, air defense, combat engineers, and infantry.
- Recruiting areas for each regiment delineated by state or regional boundaries.
- United rotation rather than individual rotation.

The characteristics of this conceptual regimental organization should be considered in detail. First, a regiment would consist of three or four battalions and would be assigned to a permanent home station. Perhaps one of the battalions would be stationed in an overseas theater, such as USAREUR. For instance, the 81st Armored Regiment could have three battalions stationed at Fort Hood and one battalion in Germany. A soldier who enlists in the regiment could initially be assigned to any of the battalions. Depending on job vacancies available as his career progresses, he may later be assigned to another battalion in the regiment. During a lifelong career, he may serve in one, two, or three of the regimental battalions. Regardless, he is continually reaffirming professional and personal relationships. At anytime during his career, he may be assigned outside the regiment to recruiting duty, instructor duty or a training command, but will remain on regimental rolls and will be associated with his regiment.

The same system would apply to an officer with some modifications. Officers serving in the regiments would be commissioned from the nation at large exactly as they are now. Once an officer is promoted to lieutenant colonel, he would be evaluated for command positions and other personnel actions against all LTC's of his year group. This would allow the best qualified officers to be chosen for command and other assignments, regardless of regimental association. If an LTC was assigned to command a battalion in another regiment other than his own, he would be required to resign from his old regiment and become a member of the regiment in which he will command.

The second characteristic of an established recruiting base links with the first. To continue our example, the 81st Armored Regiment would be assigned certain geographical areas in the U.S. to recruit enlisted men. The 81st may recruit from parts of Texas, Oklahoma, and Colorado. This same recruiting area may be shared by another armored

regiment and other combat regiments. If a young man living in this region desired to become a tanker, he would be required to enlist in either the 81st Regiment or in another armored regiment recruiting in his area. He would enlist for a *regiment*, not for a duty station. Consequently, soldiers within a regiment would have strong regional pride and kinship. If the soldier became dissatisfied with his regiment, provisions would be made for him to transfer to another regiment or arms of service.

Oddly enough, many of our units already have strong regional ties. For instance, the units at Fort Hood are composed largely of men on first-term enlistments from Texas, Louisiana, Oklahoma, and other southwestern states. Units at Fort Bragg have a large percentage of troopers on first-term enlistments from the southeastern states. Inevitably, however, rotation occurs and the initial regional identification is lost forever. A regimental system would institutionalize this social phenomenon, which is currently disrupted after the first rotation of the soldier.

The third characteristic of unit rotation would replace our current system of individual rotation. At present, the U.S. Army has a constant stream of individual replacements crisscrossing the Atlantic and Pacific Oceans. In the regimental system, battalions would be rotated on a one for one basis. For instance, the battalion of the 81st Armored in Germany would be rotated with one of the 81st's battalions at Fort Hood. The newly rotated battalion would, in time, be rotated with another stateside battalion, not necessarily within its own regiment, but from the same home station. Also, it may be desirable for a regiment to change its home station every 10 years, allowing for a change of scenery for members of the regiment. For example, the 81st would be rotated to Fort Carson and a regiment from Fort Carson would be sent to Fort Hood.

The advantages of the regimental system would be legion. First, soldiers would form life-long friendships. Families would become socially entwined into the framework of the regiment. Long-term association would build unit cohesion, solidarity, and *esprit de corps*, the essential factors for success in battle.

Secondly, Army units would be allowed to form close ties with geographical areas. Improved public relations would ensue. Unit cohesion would be further strengthened because of regional kinship. It would allow a closer kinship between active Army and National Guard battalions. A British officer analyzing the factors which upheld two British Regiments, the Middlesex Regiment and The Cameronians

(Scottish Rifles), during the black hours of World War I wrote: "First, I would place regimental loyalty; the pride in belonging to a good battalion, in knowing other people well and being known by them: *in having strong roots in a well-loved community.*"

Additionally, unit rotation would reduce personnel turbulence which currently plagues U.S. Army units, and would allow units to achieve high levels of proficiency heretofore impossible because of constant personnel changeovers. Unit moves would help reduce the culture shock and estrangement associated with overseas transfers, particularly to combat zones. Regimental battalions would be able to oversee the needs of the soldier and his family during unit moves. This would, in turn, contribute to the soldier's peace of mind and undoubtedly, would reflect in more favorable job performance.

Our army must maximize all its resources, particularly its manpower. The American Army can no longer afford to wander aimlessly with no organizational doctrine or, worse, with an organization that destroys all threads of continuity from one year to the next, and ultimately all threads to the heritage of our past. We must replace our current "disorganization" with an army based on the fraternal regimental model. To do otherwise will be to risk defeat on the modern battlefield.

"The material effect of an organization is in its power to destroy, the morale effect in the fear that it inspires. With equal or even inferior power of destruction, he will win who has the resolution to advance; who by his formations and maneuvers can continually threaten his adversary with a new phase of material action; who, in a word, has the moral ascendancy. Morale effect inspires fear. Fear must be changed to terror in order to vanquish."

This moral ascendancy can only be created by a fraternal military organization. We can, we must, make four men equal the lion.



CPT JOHN R. WALLACE was commissioned in Armor upon graduation from the United States Military Academy in 1969. He has served in several armored cavalry units in Vietnam and CONUS. Captain Wallace is currently an exchange student at the British Royal Armoured Corps Centre, Bovington Camp, England.



A Comparison

Night Fighting Capabilities

by Major William G. Private

Advanced night observation devices are becoming mandatory for our forces on the modern battle field.

Historically, there have been instances when the inability to continue operations into the night has led to the loss of tactical advantages or deprived one's force of momentary opportunities. Consideration of these limitations has impacted on our past formulation of concepts, schemes of maneuver, and battle plans. During night operations, ranges of observation and engagement were relatively short. Furthermore, the command and control capability rearward was greatly hindered and night operations became confined to slow, setpiece operations. Therefore, night combat in the past was a special operation to gain limited positive advantages over an enemy.

With the improved night observation devices (NOD's) coming into service, the above constraints are rapidly disappearing. The new passive NOD's have generally doubled the range, resolution, and efficiency of older devices. As a result, combat and supporting forces will be able to move, operate, and shoot with a capability approaching current daytime

efficiency. Terrain and obstacles can be crossed with a minimum of delay. Redeployment will be accomplished much faster. Weapons can fire further, more accurately, and with greater killing effect. These capabilities can move night combat operations out of the special operations category and make night operations a consideration in every type of operation.

These effects produced by advanced NOD's are now becoming mandatory capabilities for our forces

"... the Threat fields a force that is capable of effective sustained fighting, day and night."

on the modern armor battlefield. This is so for several reasons.

First, the Threat fields a force that is capable of effective sustained fighting, day and night. This day-night capability is a combination of a high degree of troop night training and sophisticated night vision equipment, which permits Threat forces to fight as routinely at night as during the day. We must, therefore, routinely expect enemy engagements at night that will approximate daytime scope and intensity.

Second, U.S. Army units in the next war can expect to fight outnumbered from the very beginning. To fight and win while outnumbered, we must continuously maneuver and engage the enemy, day and night. Combat at night will allow us the nighttime advantage of using smaller forces to effectively conduct combat actions against numerically superior forces.

Therefore, the requirements to conduct sustained operations and to fight outnumbered demand that our forces be able to fight as combined-arms teams at night as well as during the day.

Current Night Capabilities

Threat. Threat forces emphasize night combat in both offensive and defensive operations. The Threat's current combat vehicle NOD capability is predominantly active infrared (IR) oriented. Active IR NOD's have been developed for overall systems compatibility throughout the weapons/vehicle inventory and, in a great many instances, are interchangeable between vehicles. Passive devices have been developed and an increasing number are now utilized in some vehicles, and in crew-served and

individual weapons systems. Threat forces are considered highly proficient in using NOD systems and white light illumination. With these devices, they can effectively conduct large-scale night operations. This night observation equipment, organic to both tank and motorized infantry units, makes possible the full integration of all types of combat weapons and vehicles into a combined-arms unit without degradation to either unit's night operation capability.

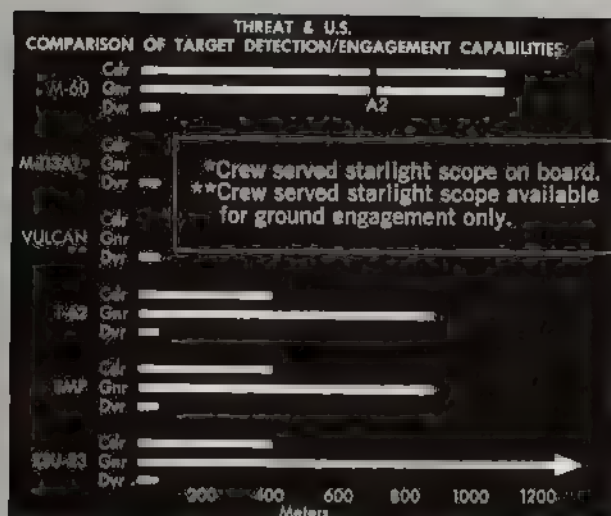
United States. U. S. offensive and defensive techniques also require extensive night combat. U.S. tanks are equipped with active infrared night observation devices that provide a night movement capability and target acquisition or engagement means; the exception being the M-60A2 tank series which possesses a limited passive (starlight) capability for the tank commander and gunner. Our personnel carriers, while not designed as fighting vehicles, possess an active IR night driving capability, but do not have an NOD for target acquisition or engagement. Additionally, U.S. forces rely on white searchlight and white light flare illumination. Current training programs are sufficient to orient crews on the operational aspects of night sighting and illuminating equipment. Full-scale training programs and tactical utilization have yet to be realized. Although a few first generation passive (starlight) sights are in the U.S. inventory, the bulk of our current family of NOD's consists of sophisticated active infrared devices. They do not possess an extensive vehicle interchange ability, nor is our NOD inventory predicated on mass utilization of NOD's by all types of combat vehicles. This capability provides for limited night movement by all our combat vehicles. Only tanks have target acquisition and engagement capabilities.

Comparison of Existing NOD's

The parallel development of active IR NOD systems in both U.S. and Threat forces has produced advantages for both sides. While U.S. forces have an advantage of 200-400 meters in tank acquisition/engagement ranges at night, Threat forces have produced a tank-motorized infantry night integration capability that surpasses the U.S. combined-arms team capability.

Developing Night Capabilities

Threat. Threat forces are continuing to develop modern night observation devices for late T-62 and anticipated T-72-series tanks, for the current BMP and for the anticipated replacement vehicle for the



BMP, BRDM, AACV, and BTR. Their objective appears to be to replace active IR systems with passive and thermal devices. This passive capability does not greatly surpass current IR NOD's for range or resolution. The basis of issue (BOI) will probably follow the current distribution of IR devices, with system integration and compatibility for all combined-arms units. These trends will greatly reduce Threat dependence on white and IR illumination at night and reduce active light signatures.

United States. U.S. development of NOD's has produced a complete family of passive devices that will vastly improve the driving, acquisition, and engagement capabilities in our tank systems. These devices surpass current U.S. and Threat active IR and passive equipment in both range and image resolution. These sights are supplemented by passive individual night goggles and crew-served and individual weapon NOD's that have resolution and distance capabilities for long-range engagements. Employment of image intensification (II) NOD's should greatly reduce battlefield vulnerability to IR detection and eliminate the need for white light except in the rarest of circumstances. As shown below, the only combat vehicle with a family of II NOD's is the M-60A1E3. BOI and type of NOD's for use with other combat vehicles have not been determined.

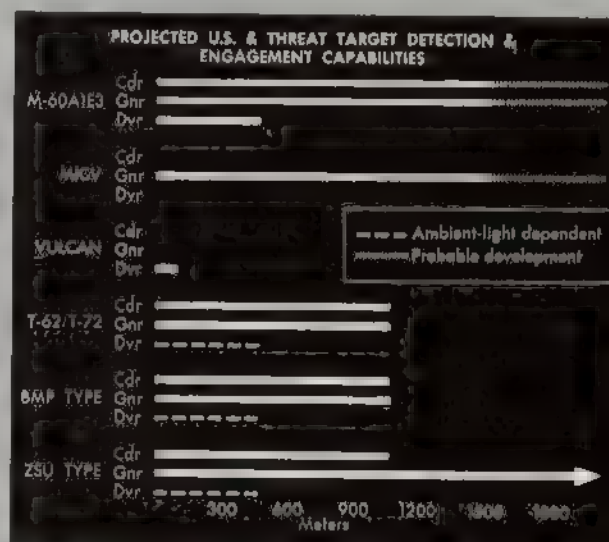
	M 60A1E3	MICV
Commander:	M-36E1-1500 + M-Passive	No vehicular integrated system*
Gunner:	M-35E1-1500 + M-Passive	M-35E2-1500 + M-Passive
Driver:	VVS-2-400 M-Passive	No vehicular integrated system*

	II
Commander:	Design program—Passive
Gunner:	Development program—Integrated, Day-night—Passive
Driver:	VVS-2-400 + M-Passive

*PVS-5 goggles are programmed: limited to open hatch operations. VVS-2 will be tested on the MICV.

Comparison of Development of NOD's

Both U.S. and Threat forces are currently developing passive (II) devices for combat vehicles and weapons systems. As with the present active IR devices, the Threat is stressing device compatibility and systems integration with all combat units. Their passive distance capability remains less than that of the U.S., giving U.S. systems potentially an identification and engagement advantage of 400-1,000 meters. Although having a potential standoff advantage, U.S. forces are now at a disadvantage, for Threat forces are *already* fielding passive devices and are concentrating on combined-arms systems integration. In so doing, Threat forces continue to maintain a tank-motorized infantry night fighting capability that surpasses the U.S. combined-arms night capability.



Night Operational Considerations

As pointed out, passive equipment is now available for production, or already coming into the inventories of both Threat and U.S. forces. Once this passive equipment is deployed to combat units in sufficient quantity, night operations will drastically change. Passive devices in M-60A1E3's, T-26's (improved) and T-72's will dramatically upgrade movement rates/distances and acquisition/engagement ranges to near day standards. Use of active illumination and associated control measures will be drastically curtailed. Integration of passive night sights will also demand dramatic changes in most aspects of our night tactics.

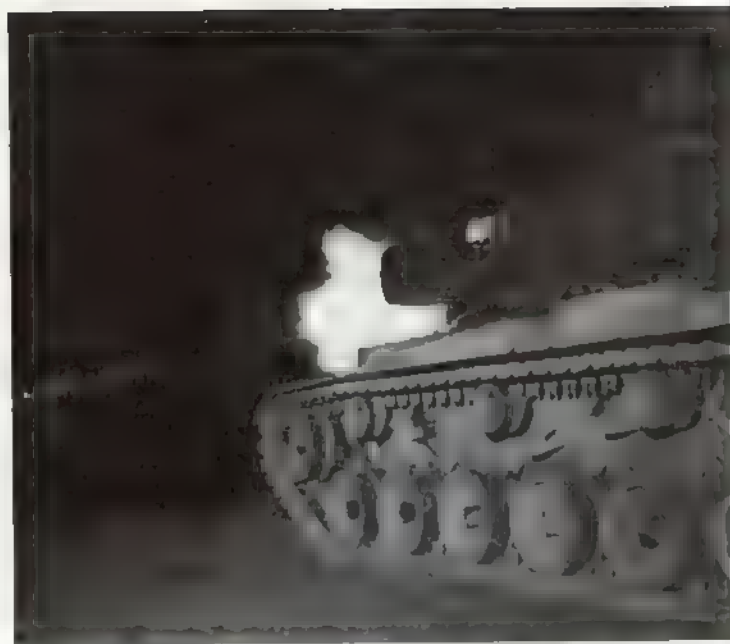
Offensive Tactics. With improved second generation devices, the objectives and the conduct of night offensive operations should differ little from those of daylight operations. Frontages and depths for

night offensive operations will parallel day distances and remain dependent on the mission, enemy defenses, terrain, and troops and equipment available. Securing deep objectives, turning to attack the rear or flanks of the enemy and attacks on rear support areas become valid missions for night operations where passive devices are employed.

Forces for conducting offensive night operations should be task organized tank-heavy, with armor units comprising the forwardmost elements in order to overrun enemy resistance, pursue enemy armor, and suppress strong points. Mechanized infantry will follow immediately behind the tanks and will fight mounted as much as possible. Once an engagement is initiated, mechanized infantry will eliminate enemy infantry and antitank weapons using their onboard and individual weapons. At night, dismounted engagements should be limited to attacks on specific strongpoints that cannot be easily approached in a mounted attack. During dismounted actions, tracks will follow the infantry to support the assault with vehicular mounted machineguns. Once a strongpoint has been neutralized or eliminated, infantry will remount to continue the attack.

Together, tanks and infantry can seek to defeat the stronger parts of a Threat defense at night. With Threat's IR capability for nighttime operations, it is difficult for a Threat defender to conduct pinpoint surveillance, detect targets, employ aimed fire, reinforce, and determine the attacker's objectives. These conditions force a defender to operate at random and heavily decrease his ability to maximize the advantages all out of proportion to their force ratio. These advantages strongly favor night offensive actions against the enemy's stronger dispositions, deferring attacks on other, more vulnerable, targets or objectives until daybreak or during the daytime.

Current U.S. night offensive doctrine is based on the use of artificial illumination (IR and white light) in order to increase night visibility for movement, maneuver, target acquisition, and engagement. Such artificial illumination, however, creates shortcomings that markedly decrease the effectiveness of night operations. For example, artificial pinpoint illumination (white or IR searchlight) illuminates a particular object or area, but the active source quickly reveals itself and can be easily detected and engaged from long ranges. Flares from aircraft, artillery or mortars provide tremendous candlepower for artificial illumination of large areas, but once delivered, they do not discriminate between friend and foe. Each may be revealed to the other. Capricious winds



may move flares so that attackers are visible while defenders remain in shadow.

With second generation passive devices, our forces can see about as well at night as when using active artificial illumination without using active or uncontrollable light sources. Therefore, use of active illumination in future offensive operations will be considered only when low ambient light levels highly restrict the effectiveness of second generation NOD's, or when combat units do not possess second generation II capabilities.

Defensive Tactics. For units equipped with second generation II equipment, night defensive operations will differ little from daylight operations. Defenders will remain mobile, engaging in ambush-like actions and capitalizing on all the advantages of the terrain and defender's equipment to whittle away at the enemy as he presses the fight. Night engagement distances for direct-fire weapons will be determined by the effective range of passive night sights.

The battlefield will continue to be organized into the Covering Force Area (CFA), Main Battle Area (MBA) and Rear Area (RA). Depths and frontages will be as in the daytime. Techniques of defense will depend on Threat offensive tactics, terrain, and troops available.

Our forces will be task organized as they were during the daytime. Covering forces will be provided with sufficient tank and antitank elements to force advancing Threat units to maneuver, organize attacks, and prematurely deploy. Main battle area forces will initially be mechanized infantry-heavy with tanks reinforcing after release from the covering force. Reserves will be small.

Use of passive NOD's adds a new dimension to the battlefield, permitting daylight defensive techniques to be employed at night. They allow both protracted engagement times and obscured movements. This is due to the disparity between current NOD capabilities of friendly and Threat forces. Even when the Threat can use his IR or passive engagement capability to maximum effectiveness, his night engagement ranges remain 400 to 800 meters less than our current II night engagement capability. This creates a favorable night standoff identification or engagement advantage for us.

Threat units can be engaged and forced to deploy beyond *their* effective engagement ranges. This allows our forces additional time in which to engage the enemy. For example, during daylight ambushes, each tank or antitank (AT) weapon normally fires two or three rounds, and then moves. At night, the Threat force can absorb two or three rounds from each of our weapons without having closed to within his identification and engagement range. At night,

"Threat units can be engaged and forced to deploy beyond their effective engagement ranges."

then, it will be to our advantage to continue the engagement until just before he has closed to his identification and engagement range, and then move before he can return effective fire.

Passive night vision devices, used in conjunction with new defensive techniques, provide a means to neutralize or defeat a numerically superior force at night with minimum loss. Therefore, the use of active illumination in night defensive operations should be considered only when a night passive capability is unavailable or the level of ambient light is insufficient to use passive devices. Active illumination reduces the advantages of the defender who has passive sights because:

- It eliminates the element of surprise by alerting the enemy of an impending engagement.
- It tends to identify the location of defending units, thereby making them vulnerable to return fires.
- It allows the enemy to use his night sights without resorting to his own light sources thus negating our advantage of forcing the Threat to use self-illumination.

Night Capability Imbalances

As discussed previously, U.S. and Threat forces have achieved near parity in the technology of passive NOD's. If both forces field combat vehicles with passive capabilities, then the range and resolution of the devices will determine who maintains a night combat advantage. If one force is fitted with complete families of passive devices and the other elects active IR or a combination of active IR and passive NOD's, then a large capability gap will exist. First, the detection range of passive NOD's is greatly increased when any active light source is emitted from the target. Second, passive systems normally outrange any IR NOD now in production. Third, passive NOD's have greater reliability than active IR devices because IR NOD's normally require searchlight which is susceptible to destruction by suppressive fires; passive NOD's require no active light system and are contained within the protective envelope of the turret. Finally, passive devices have no signature.

If a force equipped with IR, or a combination of active and passive NOD systems, conducts night offensive operations against a force equipped with passive NOD systems, the force using active and passive NOD's will require very favorable terrain, fields of fire below 800 meters, and a highly favorable force ratio. As a defender, the force using the active or active and passive NOD's will require prepared positions. In the best of circumstances, the force using an active or active and passive devices must use some tanks to provide "flicker" illumination. This requires them to move frequently and prohibits the use of their guns in the fight. "Flicker" illumination produces minimum target illumination time and a reduction of target clarity. In brief, when a force equipped with a passive system opposes a force equipped with an active or active and passive system, the force with the passive system has almost all the advantages.



MAJ WILLIAM G. PRIVETTE was commissioned in Armor in 1961. A graduate of the University of Texas at El Paso, he has served in numerous Armor, Cavalry, and Infantry units. Major Privette is currently serving with the Command and Staff Department, USA-ARMS, Fort Knox.

PROFESSIONAL THOUGHTS



I have before me a stack of training circulars that I have scrounged in various places, and frankly I am disappointed. Note well that it is not by what they say, but by what they do not say.

TC 71-4-2 Test Edition, *The Tank/Mechanized Infantry Team*, is typical. In its introduction, it says that a number of lessons have been drawn from the October 1973 War in the Middle East. The first of these is that:

"Long-range, high-velocity tank cannon and long-range, antiarmor missile systems *dominate the modern battlefield*. Anything they can see can be taken under fire and hit. Anything they can see can be killed."

"Long-range, air-defense cannon and missile systems *dominate the air* above the battlefield. They can deny forward fighting elements effective close air support; they severely limit operations of Army aircraft."

"The U.S. Army must learn to *fight outnumbered and win*. The tank ratios on the Golan Heights in October 1973 were not at all unlike those to be expected in a war in Central Europe."

The introduction goes on to say that we need a new set of priorities if we are to fight and win while outnumbered and then lists nine of them. "Battlefield movement only along *covered* (italics mine) avenues-making *maximum use of terrain to avoid* (italics mine) or *evade* (my italics) enemy long-range observation and fires." Another of them reads like this: "Suppressive fires delivered from *overwatching positions to reduce the chance that maneuvering friendly forces can be seen* (my italics) and engaged by the enemy." Avoid. Reduce the chance. In short, keep your head down.

During AOB, the emphasis was the same. "Cavalry in the Defense," read the lesson plan. "Tank Platoon in the Delay," said the next one. Almost as an afterthought, I saw, "Tank Platoon in the Attack." I got lots more instruction in defending and delaying than I did in attacking, and the message that was either stated or implied by the instructors was keep your head down and don't get shot. When the threat forces make aggressive moves; defend, delay, and survive.

I got my first instruction in Armor in my sophomore year in ROTC. I heard something there that I have not heard since. I remember well the slide that the instructor flashed on the screen because it showed a tank, guns firing, charging through an enemy defensive position. The caption, as I remember it, was "A Tanker's Best Weapons Are His Treads." Since that time, I have heard "survive," or "avoid," or "endure." Never something like "kill the enemy" or "fight."

What is the spirit of the bayonet!? To survive! To survive! To survive!

Not very impressive, is it?

Yet, intentionally or not, that is the impression that is given to young officers under training. To read and listen during training, one might well get the impression that the Combat Arm of Decision is becoming the Combat Arm of Survival. The training circulars before me are fine little books; they show a great amount of work and dedication, and the doctrine contained in them is excellent. Company or battalion wedges cruising across the North German Plain may have worked once, but they are a sure way to defeat now, and I am glad that the training circulars have taken note of this. To survive on the

modern battlefield, we must indeed use bounding overwatch and avoid enemy observation.

But is this why we are here? Simply to survive? In 1934, George Patton said, "The Army exists to kill men — not to groom vehicles." I will submit that the same is true today. We must use overwatch techniques so that we can get close enough to the enemy to kill him. We must defend and delay only so that we can draw the enemy into a trap, cut him off, and kill him.

An army that thinks in terms of survival only is not going to survive. The Israelis certainly were not thinking in terms of mere survival in 1967 and 1973. The Italians in Libya in 1940 were, though, and look what the British did to them. The same thing may well happen to us. Our emphasis on survival may very well cause us also to start surrendering by appointment. The excellence of our doctrine and the ability of our Army to win a battle when outnumbered five to one are being undermined by lack of a constant reminder of our purpose in life, which is simply to kill people.

I would like to suggest that our doctrine be modified to incorporate this most important point. All of my training circulars say that eventually they will be superseded by new field manuals incorporating what they say. By changing a few words in key places, it will be possible to change the whole emphasis of our doctrine. TC 7-3, *The Rifle Platoon*,

is an excellent example. Page 2 shows a sketch of three soldiers running up a head-deep ditch while enemy machinegun fire passes safely over their heads. The caption reads "Proper Use of Terrain is the Key to Success," and the accompanying text reads in part "Modern enemy weapons which the platoon may encounter have devastating lethality. Because dismounted infantry soldiers are virtually 100 percent vulnerable to such weapons, they can survive and successfully accomplish their missions on the modern battlefield only if they make every effort to operate without being seen." Survival is the main point here.

If we were to change the caption to "Proper Use of Terrain is the Key to Killing the Enemy," we create quite a different effect. We can increase this effect by changing the text thusly: "Modern enemy weapons which the platoon may encounter have devastating lethality. Because dismounted infantry soldiers are virtually 100 percent vulnerable to such weapons, they must operate without being seen. Otherwise, they will not be able to kill the enemy."

Armor is not the Combat Arm of Survival, but the Combat Arm of Decision.

What is the spirit of the bayonet? To Kill! To Kill! To Kill!

Let's not forget it.

—Second Lieutenant John M. Jordan
Platoon Leader, 1st Armored Division
APO New York 09066

DID YOU KNOW?

Position of Honor

Running through our customs and courtesies of the service — official and social — is the principle that the right side of a person or thing is the position of honor.

"The Right of the Line" was the critical side in ancient battle formations and is the place of honor in ceremonies. (The motto of the 14th Infantry, "The Right of the Line," comes from the honored station General Meade directed the regiment to take in a review just after the Civil War.)

The starboard or right side of a ship is normally reserved for officers to board while the enlisted visitors and crewmen use the port gangway.

In walking with a senior or riding in a vehicle the junior is on the left.

The national flag is carried or displayed to the right of all others.

A man walks on a woman's left — unless he must shift over to be on the curb side. The right is the point of honor in heraldry.

This practice originates from the days when gentlemen carried swords. For greater protection, the stronger swordsman walked to the right so that his sword arm would be unhampered for a quick draw.

An apparent contradiction to this rule is the practice of placing the flag over a casket with field of stars over the body's left shoulder. In this case it was evidently reasoned that it was more fitting for the field to be over the heart.

*From Military Customs and Traditions
by Mark M. Boatner III, Copyright 1958
David McKay Company, Inc.*

INVENTOR

(continued from page 17)

House of Representatives meeting on military appropriations in May 1932. The military appropriation bill provided for FY 1933 that "\$200,000 shall be available exclusively for the purchase of five convertible tanks." Representative Barbour supported a position that the \$200,000 be specifically used for the purchase of new tanks built by Christie. Representative Percy Stewart, who represented the New Jersey district where Christie's factory was located, also praised Christie's new tank and along with Representative Barbour attempted to modify the bill in favor of Christie.

In June 1932, the Ordnance Committee recommended the preparation of drawings and specifications that would correct the defects of the Christie tank. Shortly after the Ordnance Committee made the decision to continue to develop and improve the convertible tank, Christie offered to sell the tank tested under Contract Word 89 to the Ordnance Department for \$34,500. The Ordnance Department refused because the reports from Fort Benning and Fort Knox indicated that "many changes should be incorporated to improve the characteristics of the vehicle and to increase its durability and dependability." Christie was further advised that the \$200,000 appropriated for convertible tanks would be used to procure improved tanks "in which the weaknesses have been corrected and whose characteristics meet the desires of the using services." After the new specifications were completed, Christie's company was given the opportunity to bid.

At this point Christie became incensed and warned all his potential competitors who might bid under the circular proposals for the new convertible tank *T-3E2* that he had the sole right of manufacture, and should any other manufacturer accept a contract from the government, they would be legally liable as infringers under the Christie patents. Concerned over these threats, the Ordnance Department requested from the Judge Advocate General's Office an interpretation of government's rights and was advised that there was no legal objection to the U.S. using the Christie patents because in 1920 Christie was paid \$100,000 for present and future patent rights.

On 9 September, Christie delivered a lecture before the faculty of the Infantry School at Fort Benning, giving a brief description of the salient features of his newest tank, the *M-1932*. He was introduced by

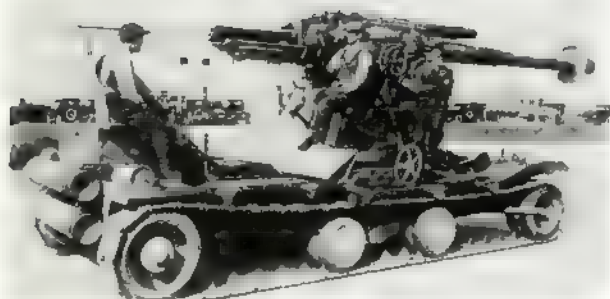
Major Sereno E. Brett, Infantry (Tanks), a member of the Infantry Board and former commander of an AEF Tank Unit in World War I. In his introduction, Major Brett stated that "Mr. Christie had expended more than \$400,000 of his fortune in his patriotic work." During the lecture, Christie described the new features of the *M-1932*, which differed considerably from the proposed tank envisioned by the Ordnance Department and using arms.

Christie also paid a visit to the Detachment, 1st Cavalry (Mechanized), at Fort Knox, to discuss the *M-1932* with the detachment commander, Colonel Daniel Van Voorhis. Major Robert W. Grow, Executive Officer and S-3, and also responsible for preparing the monthly reports on the Christie *CC T-1*, reported on the meeting. Christie claimed that he was the only man who knew how to build tanks, that he had some political influence, and that if he did not get the contract for tanks in FY 1933 he would make trouble for the company that did. According to Colonel Van Voorhis, Christie was wrapped up in his new *M-1932* and had lost interest in the *T-3* and the *CC T-1*. In general the Cavalry at Fort Knox considered the suspension system superior to current Ordnance designs, but was disappointed over the numerous mechanical problems and lack of replacement parts.

The Chief of Cavalry considered Christie a smart engineer capable of developing a remarkable armored vehicle, but the *CC T-1*'s were not adaptable for cavalry missions and were far too costly for production and maintenance for a mechanized Cavalry brigade. It is interesting to note that General MacArthur, speaking before the House Military Affairs Committee in the Spring of 1933, gave the Christie vehicle credit "for awaking the Cavalry to the possibility of supplanting the horse in some of its units with fighting machines."

By the end of September 1932, the Department of Experiment of the Infantry School, whose function was to test and develop arms and equipment that were referred to it by the Infantry Board, completed an extensive report covering the tactical and mechanical tests of the three *Medium T-3* tanks. The Infantry Board was of the opinion "that a tank possessing the convertible wheel and track feature best meets the needs of the Infantry, and that the Christie Tanks tested at this station are, by far, superior to any tank developed to date for our service."

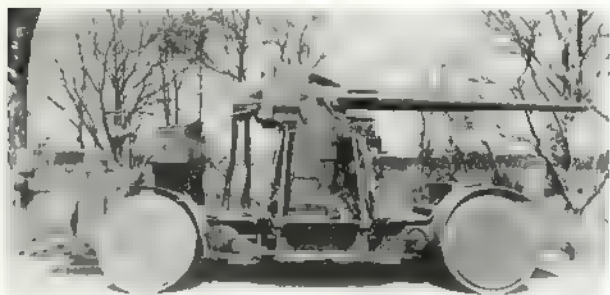
Invitations for bids were sent to 14 commercial manufacturers including the U.S. Wheel Track Layer Corporation. On 28 November the bids were opened



Christie self-propelled 4.7-in. AA gun

and 5 days later the award for five convertible tanks was made to the American LaFrance and Foamite Industries, Inc. Christie refused to bid because he felt that "the specifications as prepared do not conform to the advanced art in the construction of tanks and contain requirements which this company could not and does not desire to comply with in view of the improvements already tested by it." Christie requested the Secretary of War to reject all bids and arrange a conference "... between the officers from the Ordnance Department and from Fort Knox and Fort Benning and our company, so that proper specifications embodying the recent development of the art be prepared and the purchase of the most modern machines can be consummated." Christie also advised the Chief of Ordnance that the War Department would be held accountable for infringement of patents and rights owned by the U.S. Wheel Track Layer Corporation.

The Assistant Secretary of War rejected his request on grounds that "every effort has been made to specify those characteristics which will insure the procurement of vehicles most nearly meeting the needs of the Infantry," and that the new tank specifications were approved by representatives of the Chiefs of Infantry, Cavalry, and the Ordnance Department. Christie was unable to interest the Army in his *M-1932* and new tank concepts, and finally, due to financial pressures, sold the *M-1932* to the Soviet government through the Amtorg Trad-



M-1918 3-in. AA gun on Christie truck

ing Corporation of New York.

The Infantry continued to press for standardization of the Christie turret-type tank, but on 17 January 1933, the Chief of Ordnance in a memo to the Deputy Chief of Staff, stated that such a move was highly questionable due to three factors: the limitation of the total amount of funds allocated to the Ordnance Department, the problems of completing the mechanized cavalry program, and the consideration of the present status of Christie-type tanks.

Experiencing financial problems Christie made a last ditch attempt to sell the tank tested under Contract Word 89 to the War Department. Writing Secretary of War Patrick J. Hurley, Christie offered to sell the vehicle for \$20,000, but in the same letter was very critical of the Ordnance Department. "They are really not competitors, they are imitators, and I think you should take the power away from them and seek with others to institute a buying power for the U.S. Army directly controlled and actuated by your office." To this Hurley responded that funds in the sum of \$20,000 were not available for the tank, which in March 1931 General Hof had offered to purchase for \$54,000. Disgusted with the attitude of the War Department, Christie parked the tank in the courtyard of the State, War, and Navy Building where it remained for several months until the Ordnance Department moved the vehicle to the Ordnance Disposal Yard.

Shortly after Christie's offer was rejected, the Secretary of War issued a directive for future development of tanks and combat cars which stipulated, "the production of a vehicle to weigh not more than 7½ tons (preferably less) and to cost substantially less to manufacture than present types." This decision virtually caused the phasing out of the expensive convertible tank program and brought forward the newly developed Ordnance tank program based on the vertical volute suspension system, which was to serve as the basis for U.S. World War II tanks.

Christie's corporation went into receivership in 1934. The economic blight that struck so many companies during the depression finally caught up with the civilian tank designer. But the economic setback did not discourage Christie from tank design, mainly because of England's interest in the Christie tank based on Soviet maneuvers of 1936 where hundreds of Christie-type tanks were demonstrated. In October 1936, Morris Motors, a British firm, contacted Christie regarding the purchase of tanks. The only vehicle available was the one tested under Contract Word 89, which was parked in the Ordnance

Disposal Yard. Because the government did not own the vehicle, Christie managed to reacquire the tank which was repaired and shipped to England as a farm tractor. The vehicle (*A-13E1*) was the basis of a long series of British cruiser tanks utilizing Christie's suspension and large road wheels.

The financial assist from England prompted Christie to continue development of a lightweight nonconvertible turretless tank, which he began to fabricate shortly before the British offer. The U.S. Ordnance Department witnessed tests of Christie's new tank and reported that there were no new design features of importance and that it was questionable whether the superstructure could tolerate an additional load, especially increased armor and armaments. Shortly after the Ordnance report, Christie delivered the *M-1937* turretless tank to England in expectation of selling the vehicle to the British Army for \$320,000 including manufacturing rights. The test at Farnborough in February 1938 did not convince the British that they needed another Christie tank chassis. Perhaps the first vehicle Christie sold to Morris Motors was sufficient for providing the mechanical information required. Moreover, by 1938, the developmental cost of the cruiser tanks (*A-13E2* and *A-13E3*) had cost the British Army enough money, and therefore they were reluctant to go through a debate over the *M-1937*, which they considered not much of an improvement over the vehicle purchased in October 1936.

Christie returned to the U.S. with the *M-1937* and again attempted to sell the vehicle to the Ordnance Department. During a conference, the Ordnance Department again decided that the vehicle did not meet service requirements nor did it offer improvements over earlier models. Christie responded irrationally and stated that he was tired of building pilot models and was only interested in going to production on the *T-12* (the *M-1937* slightly modified), which he considered to be entirely satisfactory in every respect. Furthermore he was going to see President Roosevelt and high officials of the War Department to get permission to undertake the construction of a large number of Christie tanks and, if that action did not succeed, he would use an organization of civilians, which would have a sufficient number of Christie tanks built, so that one could be furnished to each college in the U.S. for training future soldiers.

Christie did not fit into the corporateness of the Ordnance Department, which found his disposition atrocious. On many occasions he resorted to flashy

demonstrations, political activity, and the news media to further his ideas and enhance his reputation. These actions brought notoriety rather than an improved position with the Ordnance Department. His fiery temper and impetuous personality more than anything else alienated the people in the Ordnance Department. He refused to abide by Ordnance and using-arm requirements and decided to go his own way. Discussing his past experiences with the military, Christie said that "all I want the Army authorities to do is say: 'Give him the money and let's see what sort of machine he can turn out.' I won't let them change a thing on it. If they try to I'll walk out. I won't let them tinker with it."

Ironically, across the ocean in England and Russia, Christie's tank concepts were fully developed because, in part, the inventor was too far away to interfere. Poland, who earlier attempted to acquire the Christie vehicle, built a prototype in 1938-39 almost identical to the 1930 Christie model. Apparently the Poles had some promotional material and photostats of assembly layouts provided by Christie in 1930 for the purpose of enhancing the salability of his tank chassis. The Germans, who abruptly ended development of the Christie tank program in Poland in September 1939, unfolded their own native tank program in the 1930's under the industrial auspices of Krupp and Daimler-Benz.

J. Walter Christie died on 11 January 1944, at Falls Church, VA, penniless and facing eviction from his home. The following year his estate filed a brief with the Chairman of the House Committee on Claims requesting development cost for his tank designs to the extent of \$250,000. The claim was never settled and Christie passed into history as a brilliant but controversial tank designer who either could not or would not relate to the new procedure of the American military establishment.



GEORGE F. HOFMANN, U.S. Army veteran and historian, graduated from Xavier University with a Master of Education degree, and from the University of Cincinnati with a Master of Arts in American History, concentrating on military and diplomatic history. He recently completed a book-length history of the U.S. 6th Armored Division, "The Super Sixth". Mr. Hofmann is currently a doctoral candidate at the University of Cincinnati.

Beginning with this issue, this new department will feature short summaries and excerpts from articles in other professional publications. The purpose is to alert ARMOR's readers to the many important and interesting subjects being discussed in today's excellent journals.

OBSERVATIONS

The following observations by David Elazar, former Israeli Chief of Staff, concerning the October 1973 War were extracted from an article appearing in the November 5, 1975 edition of the Aerospace Daily.

—Ed.

"In October 1973, the Arab countries and armies achieved a great strategic advantage due to the element of surprise at the start of the war. This element of surprise enabled them to enjoy a certain measure of success during the first 40 hours, but during the remaining period they could hold neither this advantage nor achieve further success.

"The major lessons that we should learn from the successful attempt by the Arabs to surprise us are on three levels: political-strategic, operative, and military intelligence.

"From the aspect of intelligence, we learned that the main problem was not in the collection of information regarding the preparation of the Arab armies. In October 1973, the IDF in fact had the necessary information. The element of surprise was possible notwithstanding the existence of reliable intelligence, but in its lack of evaluation and correct interpretation. Not realizing the enemy's intention — and worse — not interpreting it correctly, were the major factors. I therefore feel that the integration of the collection of information in intelligence research should be regarded as a major lesson in military intelligence from the Yom Kippur War.

"From the military-operative aspect: The prevention of surprise lies in the actual importance related

to the concentration of massive offensive forces and their deployment along the border. In modern warfare, when both sides are equipped with sophisticated and powerful weapons, one must interpret the amassment of troops, their deployment and degree of alertness as signs of aggression against which, politically, reaction by force is permissible. In such a case, when information is received that these forces indeed intend to attack, the basis for decisions should now be military-operative more than political. I believe that a preemptive strike is considered the most effective means of reaction.

"The Air Force and the armour remain the decisive factors on the battlefield. Their superiority and their success in battle are vital for victory in war. The combination of forces and complementary support is destined to ensure their superiority.

"I believe that the tank was the backbone of the land forces during this war and will remain so in the future. All antitank measures from mines to anti-tank missiles and weapons were aimed at reducing the efficiency of the tanks on the field and limit its success. Indeed, together they succeeded in one way or another in inflicting casualties and slowdowns to the impetus of the tank. It is not in their power to defeat the armour — that can only be done by a confronting armour.

"The decisive role in my opinion of the Air Force and the armour is true in defense and in offense. In the October War, it was proved once more that defense is the powerful form of combat, meaning that, inferior forces, well deployed in defensive positions are able to stop the advance of superior forces.

"This lesson cannot change the old truth that with defense alone a war cannot be won.

"But in order to win, one must attack and the sooner the better".

CHALLENGE OF MOBILE WARFARE

The challenge of mobile warfare is perhaps the greatest of all the many challenges facing today's Infantryman. Few positions require a broader span of knowledge or a greater store of tactical expertness than that of the Infantry leader in mobile warfare.

Mechanized Infantry is a critical part of the tank-Infantry team—ideally a closeknit, well trained team, in which the concept of “tanks leading” or “Infantry leading” involves only minor differences in deployment. Infantry leaders must be as familiar with the capabilities of the tank as are the tankers, and also must master all the many techniques of mechanized and regular Infantry tactics.

Tanks bring to the combined-arms team the capacity for tremendous armor-protected long-range firepower and the renowned potential for breakthrough and exploitation of enemy weaknesses. Artillery and Tacair give vital supporting fire; the Infantry contributes virtually everything else. It is therefore critical that Infantry leaders know in detail the different roles they may be required to follow on the modern battlefield, and be prepared to promptly, aggressively and competently assume the correct role for any situation. It is this capacity for multiple roles by Infantry that permits the combined-arms team to respond to any enemy threat or defensive posture.

Where the enemy, through choice or circumstance, fights on terrain that facilitates armor tactics, the Infantry leader aggressively accepts the role of enhancing and exploiting the capabilities of the tank. He deploys his forces to protect the tank from enemy antitank weapons by attack or suppression of those weapons. He supports the tanks at a distance that enables him to quickly respond to any threat from enemy Infantry. He seizes and, when necessary, holds terrain that may be an area of threat to the advancement of friendly tanks. He clears obstacles that obstruct the team's progress. He remains in constant readiness to assume the lead whenever the terrain or enemy situation becomes unfavorable for rapid tank movement.

With Infantry fighting mounted where possible, on foot when necessary, the combined-arms team develops the tactical situation and finds the enemy weaknesses. The Infantry, tanks, artillery, engineers, Tacair, helicopters, and every other available resource suppress or destroy enemy strong points. The combat team uses its mobility to quickly mass decisive combat power when required. *TOW's*, *Dragons*,

tanks and *LAW's* bust enemy tanks where they appear singly or in groups. The Infantry structures the battlefield. When the best way to use tank-heavy forces becomes apparent (and this may be anytime from a few minutes to several hours after initial contact), then tanks smash into the enemy's vitals. But in this decisive action, tanks must be closely supported by mechanized Infantry.

Since tanks alone have difficulty holding terrain against a combined-arms assault, the task of mechanized Infantry in defense remains that of doing everything that can't be done by tanks or artillery. Our *TOW's* and *Dragons* actually give a well-trained, covered and camouflaged Infantryman several advantages over an attacking tank. Except as needed in support, our tanks should be used in ways that maximize their rapid fire accuracy and their ability to deliver a crushing counterattack.

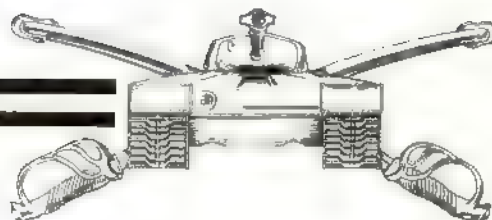
Antiarmor tactics may succeed in forcing the enemy to fight where tanks and even Infantry carriers cannot effectively operate. Here the flexibility of mechanized Infantry permits the combined-arms team to attack or defend in full measure, with dismounted Infantry fighting in its classic role and the tanks and carriers supporting by fire where possible.

With the repertoire of combined-arms “ring action” on the armored battlefield, the tank hits the right cross. The jabs, hooks, feints and bear hugs are provided by mechanized Infantry.

In the dynamic environment of the future battlefield—through the confusion, noise, obscuration, danger, fatigue and fear—the Infantry leader must make quick and sure decisions as to which of his several roles he should follow. He must be able to move, attach, detach, receive and immediately employ units on instant notice. He must be prepared to take appropriate action without waiting for orders or detailed guidance. He does not compete with friendly tanks; however, he busts the others. He develops, protects, exploits, facilitates and optimizes the potential of armor. His knowledge, drive, fitness, courage and flexibility, and the responsiveness and professionalism of his unit give the combined-arms team the capability of victory in any situation.

Major General Willard Latham
Commandant, U.S. Army Infantry School

Infantry Magazine Nov.-Dec. 1975



OFFICER CAREER NOTES ARMOR BRANCH OPMS

Alternate specialties for captains in basic year-groups 1968 or earlier were designated in July 1975. Simultaneously, a 2-year moratorium was placed on requesting changes to these designations. Officers who have not received official notification of their alternate specialty (DAPC-OPD Form 856) and are within basic year groups 1968 or earlier should write to DA (DAPC-OPE-P), USA MILPERCEN, 200 Stovall Street, Alexandria, Virginia 22332, or call Major Herbert E. Koenigsbauer Jr., Specialty Coordinator, Company Grade Combat Arms Division, *Autovon* 221-7820/7819.

Officers, who have not had an alternate specialty designated, should indicate on their assignment preference statement the specialty in which they would like to be assigned at their next duty station. Assignment officers will do their best to match specialty and geographical preferences with requirements. Keep in mind, however, the thrust of assignment actions during the first eight years of service is focused on developing the officers' primary specialty — Armor.

Specialty Training

The most technically oriented and highly specialized training available for the officer desiring qualification training in his specialty fields are found in the military training centers and institutions. For the combat-arms officer this training normally occurs after achieving certain basic specialty qualification milestones; such as attending the advanced course and completing a command tour successfully. Selection for this type of training is made on a best-qualified basis with the manner of performance in related areas of experience being the prime discriminator. Officers *must* become intimately familiar with DA Pam 600-3 (Officer Professional Development Utilization) then research DA Pam 351-4 (U.S. Army Formal Schools Catalog) to determine the professional or specialized training he requires. To list all the possible combinations of specialty/special-

ized training is not possible, however, a few examples for illustrative purposes are listed for your consideration.*

Specialty	Course Number	Title
Personnel Management	7C-2260 HRM	Personnel Management Human Resources Management
Comptroller	7D-2800	Military Comptrollership
Logistics Management	8A-F17	Logistics Executive Development Course (LEDC)
Foreign Area Officer	7B-F3	Foreign Area Officer Course
Research & Development	SL-F3	R & D Management Orientation
	4F-1181	Systems Engineering, Analysis, Management Course
Club Management	8E-4112	Club Management
Information	7E-F21	Army Management Information Officer
Automatic Data Processing	7E-F1	ADP Systems Analysis Officer
	7E-2402	ADP Officer Course

*MANY, MANY MORE — It will definitely be worth your time to look them over.

Aviation Specialty

Career management divisions of the Officer Personnel Directorate are screening the records of all rated officers who were commissioned in basic year group 1968 and earlier to determine which specialty combinations to be recommended to the aviator in the field. These record screenings will consider level of experience, manner of performance, educational background, Aviation Career Incentive Act (Gate) status, and projected requirements for the aviation specialty. These considerations will then be translated into recommendations to each officer as to which specialty combinations appear to best suit the officer and the needs of the service. Recommendations will then be sent to each aviator for his consideration and statement of preference. Career management division recommendations are currently scheduled to be mailed to individual officers in the first quarter of CY 1976.

Degree Completion Program to Continue

The Senate has overridden a proposed House reduction in funds for the undergraduate degree completion program (DCP). But even though funds are available for DCP, there has been a drastic reduction in PCS funds. Therefore, reduction in PCS funds requires close scrutiny of PCS moves in conjunction with DCP. Several options are available for an officer to get approval for a DCP and remain within the confines of the PCS restriction. They are:

- A DCP at present duty station or in conjunction with the officer advance course without involving an additional PCS.
- A DCP at a location near a military post where it may be possible to obtain a future assignment to that post.

Both options are directed at getting a DCP and an additional assignment with only one PCS move.

Although the regulation provides for 18 months for a DCP, we encourage each officer to get his requirements for degree completion down to 12 months.

Each case will be judged on its own merits, with the emphasis being on limiting the expenditure of PCS funds.

Branch Transfers

Carefully analyze your proposed branch's career patterns and qualifications to insure that if selected, you can make a contribution to that branch and will remain professionally competitive. Normally branch transfers will be favorably considered provided the branch you are requesting is understrength in your year group and component, and your current branch is close to authorized strength or is overstrength. Transfers are normally disapproved if you are:

- RA with less than 18 months in the branch to which you were originally appointed.
- Serving in a detail branch. You must serve that detail plus 1 year in your basic branch.
- Other than RA and have not completed a probationary period in a competitive voluntary indefinite status.
- Serving with the Army National Guard on active duty.
- An aviator and the gaining branch is not authorized aviators.
- In receipt of reassignment orders or an alert prior to initiating your application.
- An advanced degree graduate from a fully-

funded civil schools' program serving a required utilization tour, or are in a deferred utilization status.

- Unqualified by virtue of not possessing special qualifications established for the gaining branch (e.g. civil education, security clearance, etc.).
- Under consideration for elimination or release by the DA Active Duty Board.

Procedure for Requesting Copies of Efficiency Reports

When you review your Official Military Personnel File at Records Services Branch in the Personnel Actions and Records Directorate in MILPERCEN, you may request a copy of an efficiency report to use in a personnel action, such as an efficiency report appeal. There is no charge for this service. On the other hand, if, you desire more than one report, you will be charged a minimum 2-dollar fee. The 2 dollars buys six pages of copied material with an additional 5 cents being charged for each additional page over six.

If you have authorized another officer to review your records, that officer may also avail himself of the reproduction service at the standard rate. The money may be paid to a clerk in Records Service Branch. A copy of one report will be sent to you if you intend to take some personnel action requiring the report (write to DAPC-PAR-S, 200 Stovall Street, Alexandria, VA 22332). If more than one report is desired, the standard rate is charged and you must send a check made out to "Treasurer of the United States" prior to receiving the material. OER's are not provided on written requests from other than the officer concerned.

OER Appeals

A significant change in time limitations on OER appeals was initiated with DA Form 67-7. If an OER is going to be appealed, the appeal must be submitted within 2 years of the "THRU" date reflected on the DA Form 67-7. The 5-year time limitation on the submission of OER appeals on reports rendered on DA Form 67-6 and earlier report forms remains in effect. Reports (67-6 and earlier) beyond this time limitation are not subject to appeal if it can be determined that the appellant had knowledge for at least 2 years of the existence in his official record of the OER in question. □

NOTES



DRAWING PRIZES

The presentation of four prizes will highlight the Armor Dinner Dance during the Annual Armor Conference and the 87th Annual Meeting of the Armor Association in May (See inside back cover). The Grand Prize is a fireable reproduction of the famous 1855 Hawkins .50 cal percussion hunting rifle. Second prize is a unique .44 cal flintlock dueling pistol with hand-carved grip. Third prize is a cased "Buck" hunting knife. Fourth prize is a 3-year membership and subscription to *ARMOR* Magazine. Association members must be present at the dinner to win these drawing prizes.

AN/VSS-4 SEARCHLIGHT

Combat experience with U.S. main battle tanks has shown that our searchlights are vulnerable to small arms fire and artillery fragments. The AN/VSS-4 searchlight program is an effort to replace current searchlights with a smaller, less vulnerable, armor-protected model. The

AN/VSS-4 can be mounted under the primary turret armor. The only exposed portion of the light is an aperture of less than five inches in diameter. The light will have approximately the same illumination capability as current searchlights and features both white light and pink light modes. The AN/VSS-4 is scheduled for production in 1978.



ARMOR AWARD WINNER

The United States Armor Association's Executive Council voted during its May 1974 meeting to award two \$50 savings bonds annually for "the most innovative or stimulating" articles published in *ARMOR* Magazine. One award was to go to a company grade or warrant officer and the other was to go to an enlisted man or woman.

The top article written by a company grade officer as selected by a committee of senior officers, was "The Big Sleep." It was authored by Captain Andrew J. Bacevich Jr. and appeared in the May-June 1975 issue. Captain Bacevich was commissioned in Armor upon graduation from the United States Military Academy in 1969. He served in Vietnam with the 1st Squadron, 10th Cavalry and was later a troop commander with the 3d Armored Cavalry Regiment. A recent graduate of the Armor Officer Advanced Course, Captain Bacevich is currently completing a master's degree in history at Princeton University.

Articles submitted by enlisted personnel during 1975 were received too late for publication during that calendar year. □



Buckshot For Pistols

A few words about the pistol. If we are to retain it in its present general form, I am in favor of a caliber large enough to take a buckshot cartridge. We do not want a pistol for accurate shooting at long range, but one that will fill the air with missiles at short range. Our object should be to give disabling rather than fatal wounds.

Of one thing we may be assured, that either weapon is of little account in the hands of those not well instructed, and the best argument I have heard against the pistol is that it is more dangerous to friends than to foes in the hands of one who does not know how to use it. My arguments in favor of the pistol are based on enough instruction to make all reasonably expert; we cannot make our men expert in three arms. Let us do the best we can with the two most desirable.

Cavalry Journal
April 1904

Shadows Of The Past — Shades Of The Future

If you are an average patriotic American, you believe:

- 1) That the U. S. Army, though small, is a crack force well-equipped with the latest weapons;
- 2) That if America were attacked, the nation's industry, greatest in the world, could begin supplying a large volunteer army at once with all the arms it would need for the nation's defense.

Neither of these comforting beliefs is true.

Among the armies of the major powers, America's is not only the smallest but the worst-equipped.

Most of its arms are outmoded World War leftovers. Those which can be saved are badly in need of modernization.

Some of its post-War weapons are already, in the military sense, obsolete, i.e., surpassed by weapons in possession of foreign armies.

It has developed up-to-date weapons, but has far too few of them for modern war.

Most of its modern weapons are so few that the ammunition would be shot away in an appallingly brief time. For some of its weapons, it has no ammunition at all.

AND—if America should be attacked, it would be eight months before the nation's peacetime industry could be converted to production of the war supplies which the Army would need. Whether there would be any army left to supply at the end of those eight months is disputable.

These are the facts. There is no cause for hysteria in them. If there were, the U.S. War Department would not have allowed LIFE to take the photographs and print the figures which prove them. None of the aggressor nations—Germany, Italy and Japan—is in a position to attack America in the near future. There is still time to prepare. But the time to rally such strength as we hope will keep any combination of aggressors from ever daring to disturb us is not too long.

The U.S. Army is unprepared to fight a major campaign because until September 29 Americans did not much care how well-equipped it was, and Congress regularly discounted the pleas and warnings of the General Staff. But on September 29 at Munich the world changed. . . .

Life Magazine
1938



THE WITNESS AND I

by O. Edmund Clubb. Columbia. 314 pages. 1975. \$9.95.

If you're wondering why all the furor over the CIA list of "10,000" names, or over FBI files, or Army "snooping" on civilians, read O. Edmund Clubb's account of what such files can lead to. The pendulum has now swung so far in the direction of civil liberties that we tend to forget that the pendulum has swung — and may again swing — in the opposite direction. If Clubb, then a senior official in the State Department, could be publically denounced and hounded for a casual conversation he held 19 years earlier, then what can those expect who gave direct aid and comfort to those who were killing American soldiers in Vietnam? It is ironic to speculate that those who may ultimately have the most to lose over the South Vietnamese collapse may very well be those who were most vocal in denying aid to South Vietnam to resist North Vietnamese aggression. The reaction to "who lost Vietnam?" may well be as bitter and vituperative as the "who lost China" issue that bedeviled Mr. Clubb. To those who believe "It can't happen here," *The Witness and I* is a sobering experience.

In December 1950, O. Edmund Clubb was seemingly at the top of his profession. A career foreign service officer since 1928, he had risen to the rank of FSO-1 (roughly equivalent to a Major or Lieutenant General), and only his assignment in China had kept him from promotion to career minister. Director of the Office of Chinese Affairs, Clubb had come from the arduous assignment of maintaining American representation in Communist China from January 1949, when the Communists seized Peking, until he was ordered out in April 1950. An "old-China-hand," Clubb had served in the Far East since 1929, at Peking, Hankow, in Hanoi (where he was interned by the Japanese for 8 months), Lanchow and Tihwa (Urumchi), and as Consul General in Vladivostok. He was considered by his superiors in the State Department as probably the most knowledgeable officer in the

Foreign Service on China — hence his appointment as Director of the Office on Chinese Affairs.

Suddenly, on December 28, 1950, all of this was called into question by the State Department's Loyalty Security Board (the LSB). Under heavy fire from Senator Joseph McCarthy to find and eliminate the "Communists in the State Department" who had lost China, they were clutching at every straw. Aside from vague allegations that Clubb had "pink" tendencies, and had associated with known Communists, the main allegation concerned a conversation Clubb had had in 1932 — 19 years earlier — with Whittaker Chambers — a conversation that even Chambers described as innocuous.

Clubb describes in great detail the problems inherent in defending yourself from faceless charges, in proving yourself innocent when you cannot even determine who has found you guilty. Fortunately, in Clubb's case, justice did out, and in February 1952, he was completely cleared by the State Department and reinstated. Believing that his career had been irreparably damaged, Clubb then resigned from the Foreign Service, and has since devoted himself to teaching and writing. In retrospect, his retirement was probably a blessing, since he has had more impact on United States' China policy as an author than he probably could have had if he had remained with the Department of State. His masterful summary of the development of China — *Twentieth Century China* — (the revised edition was reviewed in the *Star* in 1972) has remained a landmark volume, and has influenced a whole generation of Asian scholars. It remains probably the best single-volume source on contemporary China.

Understanding Clubb's bitterness over his shabby treatment, he makes too much of a villain of the military. To categorize Patrick Hurley or Dean Rusk as "Army officers" is to do both Hurley — an Oklahoma politician — and Rusk, a disservice. Neither were professional soldiers. He complains that formerly, "Foreign Service officers were primarily concerned in their professional capacities with the development and maintenance of friendly relations with other people . . . The introduction of military personnel . . . exerted a subtle influence

for a change of values (towards 'adversary' relationships)." Yet, perhaps a valid criticism of our pre-World War II foreign policy was that too much was spent on friendly relations with Nazi Germany, Imperial Japan, and Communist Russia, and not enough on protection of U.S. interests worldwide. But these points do not subtract from the value of Clubb's book.

In his final chapter, Clubb recounts the immeasurable harm that McCarthyism did to the United States. When government representatives are afraid to report the truth as they see it, for fear of future retribution, then the entire nation suffers. The danger does not only come from the Right. I wish Mr. Clubb had also spoken out about the treatment of former ambassador to Laos, McMurtrie Godley for doing his duty as he saw it, and carrying out the lawful orders of the executive . . . for which he was punished by the new ideologists.

If it is true that history tends to repeat itself, then *The Witness and I* is a book to be read with care.

Lieutenant Colonel
Harry G. Summers, Jr.

WALL STREET AND THE BOLSHEVIK REVOLUTION

by Antony C. Sutton. Arlington House. 228 pages. 1974. \$7.95.

In this present era of "detente," Antony Sutton has produced a piece of very readable and scholarly research which blows apart the myth of capitalists versus communists. No review could even begin to bring out the wealth of important information contained in this astounding book. What Sutton proves, utilizing the State Department Decimal File (particularly the 861.00 section), personal papers, biographies, and other historical works, is that there was a very direct link between some American international banking and commercial interests, and numerous revolutionaries who took part in the Bolshevik Revolution of 1917 which delivered Russia into the hands of the Communists.

What is exposed here is a partnership between international monopoly capitalism and international revolu-

Information concerning the availability of professional books may be obtained from the U.S. Armor Association, P.O. Box 0, Fort Knox, KY 40121.

tionaries; each working for their own, as well as their mutual benefit. The final chapter to all this we may see within our present generation.

Previous works by Sutton demonstrated that Western technological assistance to the Soviet Union from 1917 to 1972 helped create the military apparatus, which now threatens the survival of the non-Communist world. This latest book documents the foundations of Western investment in the Soviet Union and the establishment of Lenin and Trotsky as successful revolutionaries. Two men who figure prominently in Sutton's book are J. P. Morgan (Guaranty Trust) and John D. Rockefeller (Chase Bank). Strange? Well, maybe not.

Apparently it was deemed feasible by the Morgan and Rockefeller interests, as well as others working through Wall Street, that the most efficient way to gain an unchallenged economic monopoly was to follow a political line, and have society, in turn, work for the monopolists; all under the guise of being in the public interest. Certainly, this would be one way to meet the potential competitive economic challenge to the United States, which could come about if the vast resources of Russia were allowed to develop in a *laissez faire*, competitive, free enterprise situation. One can speculate and see an attempted realization of the "Heartland" theory by certain opportunists. Possibly cer-

tain of these men entertained a desire for power of grandiose proportions, and these same men saw that through advancing world socialism, they could achieve their aims. The continuous financial and technological support rendered the Communists by the Free West from 1917 to the present indicates something of this nature. The reader can judge for himself.

It is well known that the German General Staff of Kaiser Wilhelm II assisted Lenin in the latter's movement through Germany to Russia to capture control of the revolution which would take Russia out of the World War. Sutton's evidence of Wall Street assistance to the Bolsheviks and other revolutionaries implicitly points the finger to treason in Wall Street's direction. Consider: taking Russia out of World War I in 1917 released hundreds of thousands of German troops, otherwise occupied on the Eastern Front, to the Western Front and greatly assisted the German offensive of 1918; which in turn inflicted scores of thousands of additional casualties on the Allies and the United States. Any assistance deliberately rendered to those who took Russia out of the war was truly treasonable in every sense of the word. But this is not all.

Sutton's research has uncovered documentation which shows that aid to foreign revolutionaries was not an isolated case. Wall Street institutions were materially (rifles and ammunition) involved in Caranza's and Villa's activities in Mexico, as well as (financially) with Sun Yat-Sen's revolution in China. The latter case is hailed by the Chinese Communists as a forerunner to their own revolution.

You may not enjoy reading *Wall*

Street and The Bolshevik Revolution but, in order to comprehend what is happening politically, economically, and militarily in this era of "detente," this book is basic to that understanding.

Major Sewall H. Menzel II
HQ, DA

THE PEOPLE'S LIBERATION ARMY: COMMUNIST CHINA'S ARMED FORCES

by Angus M. Frazier. Crane, Russak and Company, New York. 59 pages. 1973.

The People's Liberation Army (PLA) is an excellent analysis and evaluation of China's armed forces today. This short, but well written monograph examines the Army, Navy, and Air Force of mainland China to identify those characteristics and capabilities that apply to operational functions.

Personnel strengths are examined along with the numbers and types of equipment available. The author makes the point several times that the PLA is only one competing element in a system of chronic shortages. Notwithstanding, the Chinese are devoting 10 percent of their gross national product to defense, and they are making significant progress. After discussing those physical characteristics, the location and deployments of the forces are examined. In analyzing the capabilities and limitations, the monograph uses three postulated cases which include the use of nuclear weapons in each case. These cases are defense of the homeland, offensive operations outside national boundaries with continuous lines of communications, and offensive operations outside the national boundaries with discontinuous lines of communications.

The Peking view of threat to Chinese security identifies the Soviet Union as the primary threat. The Chinese-U.S. differences center around U.S. support of Southeast Asia, Taiwan, Korea, and Japan because the U.S. support interferes with the Chinese desire for hegemony. The threat from Japan, India, and other adjacent countries is also examined.

The author is a retired Marine colonel who has served in both mainland China and Taiwan. While on active duty, he attended the National War College and the British Joint Services Staff College.

Colonel Carl M. Putnam
Chief, Atlanta Readiness Group

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Annual Armor Conference
in conjunction with
87th Annual Meeting
The U.S. Armor Association
Fort Hood 19-21 May 1976

Mark your calendars and start planning to attend the 87th Annual Meeting. Further details, registration and proxy forms will be mailed to all Armor Association members by 15 March 1976.

WEDNESDAY, 19 MAY 1976

- 0800 – 1600 Arrival and Registration
 Visit 1st Cavalry and 2d Armored Division
 Museums and Armed Forces Week equipment display area.
- 1700 III Corps Flag Ceremony
- 1800 Texas Barbecue — 49th Armored Div (Texas ARNG)

THURSDAY, 20 MAY 1976

- 0730 – 0930 "The United States Army Heavy Corps"
 A series of presentations relating to:
 ● The Threat
 ● Tactical Employment — Concept and Doctrine
 ● Integrated Ground/Air Operations
 ● The Role of the Armored Cavalry Regiment — 3d ACR
 ● Combat Support — III Corps Artillery, 11th ADA Group
 ● Combat Service Support — 13th COSCOM
- 0930 – 1000 Travel to Field Training Sites
- 1000 – 1700 Observe Field Training of III Corps Units, with a focus on:
 ● Tactical Operations Center — Battalion thru Corps level
 ● Tank Platoon Battle Run
 ● Cost Effective Training
 ● Tactical Employment of the Helicopter
 ● Employment of a Corps Engineer Battalion
 (Combat Heavy)

NOTE: Lunch will be served in the field

- 1900 Armor Dinner Dance

FRIDAY, 21 MAY 1976

- 0800 MASSTER Command Presentation
- 0900 Trends in Armored Cavalry Organization and
 Equipment
- 1000 Personnel Management — From the present
 to the 1980's
- 1100 Business Meeting
- 1200 Luncheon
- 1400 Executive Council Meeting

The Fighting Vehicle System Section, Combat and Surface Mobility Division of the American National Defense Preparedness Association will not conduct its meeting concurrently with the U.S. Armor Association this year.

Coming in **ARMOR**

"Wheels and Tracks"

Dr. M. G. Bekker explains why he contends that it is an illusion that more research and development will invent something better than a wheel or a track. Instead he says that the next step in ground mobility is up to the user and to the user's ability to formulate new requirements which do not echo the past.

"The Gasoline Brigade"

The performance of the "Gasoline Brigade," as it was called by newsmen, was no more than could be expected from such an indifferently mechanized organization. The rattletrap trucks and aged tanks made 4 miles an hour instead of a scheduled 10. And what one writer described as "an ominous rumble" was all too often the wheeze of a motor in its death agony. Thus did the Cavalry begin the transition from horses to tracks and wheels.

"The Making of a Tanker"

Captain Robert E. Laird describes the program of instruction and the sophisticated training equipment of the "Holder College of Armor Knowledge" where future tankers who are undergoing one-station training at Fort Knox gain 75 percent of their armor crewman skills.

"Reduced Vulnerability"

Four major programs for maintaining the M-60 tank as a serious protagonist on the battlefield of the future by reducing its vulnerability are suggested by Captain James D. Brown.

ARMOR

may-june 1976



WHEELS

and

TRACKS

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The Lightning Brigade
COL JAMES W. BOOTH



"To disseminate knowledge of the military arts and sciences, with special attention to mobility in ground warfare; to promote professional improvement of the Armor Community; and to preserve and foster the spirit, the traditions and the solidarity of Armor in the Army of the United States."

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Cover

Dr. M.G. Bekker, a noted ground mobility expert, explains why he contends that it is an illusion that more research and development will invent something better than a wheel or a track in his article beginning on page 15. (Cover by Steven Flanders)

"Old Lessons Learned"

Dear Sir,

As an infantryman and a student of antitank operations, I find it necessary to comment on an article by Major K. Peter Hein titled "Old Lessons Learned" (*ARMOR*, September-October 1975). Major Hein presents a succinct overview of portions of the 1973 October War and presents a series of recommendations based on his analysis. Unfortunately, a number of his expansions concerning antitank operations in Europe do not follow logically from that analysis.

Given the current and proposed disposition of antitank weapons within the infantry battalion and the missions assigned to those units in Europe, tank killing, rather than being the "in addition to" task Major Hein sees it, is the primary function of the mechanized infantryman in the defensive portions of the "first battle of the next war." With up to 18 TOW launchers assigned to each infantry battalion (6-12 in the antitank platoon and two in each rifle company), the present long range antitank capabilities of the infantryman is formidable. In addition, each rifle squad has one Dragon medium antitank weapon with a 1,000-meter range. The present organization, therefore, gives the division with six infantry battalions 108 heavy and 108 medium antitank missile launchers. With this composition, the Infantry officers commanding these units had better be experts in tank killing.

The Infantry School has recently proposed a mechanized Infantry battalion reorganization that consolidates all TOW assets into an antitank company of four platoons of five launchers each. While I am not pleased with the proposed deletion of TOW at the rifle company level, such a limited consolidation does leave these crucial weapons under the control of the infantry battalion commander who must execute the mobile defense/armored attrition of the "first battle."

Major Hein appears to totally ignore these forces as a major factor in tank killing. Rather, he posits the rebirth of the anachronistic divisional antitank battalion armed this time with TOW, rather than a 75-mm or 90-mm gun, and mounted on "quarter-ton or light tracked vehicles" rather than M-2 halftracks or the Sherman chassis of the M-10 tank destroyer.

Although Major Hein does not provide a detailed organization for this battalion, it may be assumed that each platoon would consist of three to five self-propelled TOW

systems, with three or four platoons per company. With 20 launchers per company, the battalion total would be 60 heavy antitank weapons, a formidable increase in antitank firepower. However, if this battalion is deployed as Major Hein suggests—to "dissipate enemy armor strength during defensive operations," company- or platoon-sized elements would be deployed for close-in protection and, possibly, logistic support with forward infantry battalions. If a divisional AT company were assigned to a forward brigade, it could be placed *opcon* to the battalion astride the major anticipated avenue of armor threat, thus providing that battalion commander with considerable firepower for defense in depth.

However, with the width of present brigade sectors, a more likely distribution would be by platoons, as the tank threat is unlikely to be so well identified or limited to a few easily defended avenues of approach. The addition of five TOW launchers to a rifle battalion in such a manner seems hardly worth the effort. Attachment, operational control, or simple coordination efforts would place considerable strain on the divisional AT platoon leader and add one more unfamiliar unit and leader to a battalion commander's already considerable control load.

Secondly, Major Hein's proposal that the antitank battalion operate "the divisional antitank operations center and coordinate all resources available for antitank operations..." leaves the division TOC and staff with little to do but long range planning, administration, and logistics. The division's mission is killing tanks and their supporting arms. Only the divisional TOC has the communications, personnel, and decision authority to manage all available antitank resources. If Major Hein's proposal were accepted, a battalion level operations section would be directing brigades, divisional artillery units, gunships, and tactical air for the entire division. The impracticality of this suggestion is evident.

The combat environment in Europe, which will surely include electrical countermeasures to disrupt communications, masses of civilians in automobiles to retard movement, and broad frontages for NATO units, favors self-contained and fully integrated combined-arms teams to conduct the mobile/attrition defense. Antitank assets must be integral to the forward battalions, not sent forward from a division base. While strong tank forces must be retained for the counterattack, tanks must still attack as part

of a combined-arms team. Major Hein's own analysis of the October War makes this clear. And tanks, with their ability to withstand heavy artillery fire and to fire on the move, are required with the forward elements. Only tanks can provide the mobile covering fire which will give the missile-equipped infantry a chance to survive the successive leaps backwards to new launching positions. Once out of enemy tank gun range, the infantry can cover the withdrawal of the tanks. In effect, tanks and missile launchers must execute a bounding overwatch in reverse if either is to survive the assault by superior numbers.

As a concluding note, I doubt that many Armor officers would relish the role Major Hein proposes for them as the leaders of a ¼-ton or APC-mounted antitank force. However, most infantrymen have accepted this task as their priority mission in Europe. For us, tank killing is not an "in addition to" task, rather in "the first battle of the next war," it is our reason for being!

BRUCE T. CAINE
Captain, Infantry

Newburgh, NY 12550

Turretless Tank or Tankless Turret?

Dear Sir,

My good friend Richard Ogorkiewicz has made a very good case for the turretless tank as epitomized by the Swedish *Strv 103* (*S-Tank*). There are undoubted advantages in this type of configuration from the designers' point of view, and the *S-Tank* is capable of a high proportion of the work a main battle tank may be expected to do.

However, the fixed-gun concept is not as great an advantage in the field as its proponents imagine. In the context of a defensive battle, which is the most likely scenario for NATO, our MBT's will be required to spend much of the time in hull down positions, either prepared or extempore. They will, from these positions, need to cover a wide arc of fire, necessitating traverse over arcs of 90-160° (or more where possible). A *Leopard*, for example, can sit in a gap 3.5 meters wide, or in a weapon slot dug out by a dozer blade to that width. It can be camouflaged so that only the gun barrel is visible (and that with difficulty), and the camouflage remains good all the while the tank is in the position. It can track smoothly a moving target without giving away its position.

The *S-Tank*, in similar circumstances, must, in order to traverse through 90°, have an emplacement of 9.1 meters width. If it is a dozed-out pit, there is more spoil disposal, and camouflage is a greater problem. Tracking cannot be as smooth as with a turret, since the base on which the tank is traversing is not firm or level.

The *S-Tank* design has the advantage of low height above the gun bore-line, compared with a conventional turret. But when firing in depression, the rear of the *S-Tank* must be raised, thus presenting an increasing target area (not to the target vehicle, but to other supporting tanks). Not so with a gun which can move in elevation.

Much has been made of the ability of a turreted MBT to fire on the move, and as much by the supporters of the *S-Tank* denigrating this feature. However, the ability to fire on the move is an emergency matter compared with the ability of a tank with a stabilized, turret-mounted gun to track while on the move so that, when the tank halts, only a minor correction has to be made before firing. A good system should enable the main armament to be held between 1 and 2 mils of the aiming point.

This the *S-Tank* cannot do under any circumstances, even if the target is straight ahead, and seconds lost in engagement time can mean life or death—at both ends of the engagement. The autoloader of the fixed gun tank, its stabilized sight with automatic line-up, cannot keep the gun aligned on target while on the move, and the traverse time must add those vital seconds before the first round can be fired.

The ability of the *S-Tank* to engage secondary targets with its externally mounted machinegun operated by the commander is a negligible asset. It could however, be improved by having the machinegun in an armored cupola which could protect the firer, and it should be operated by the gunner—or at any rate, not by the commander whose attention should not be diverted from his primary task, the fighting of his tank. To take Mr. Ogorkiewicz's "racing-car" analogy, what accidents would occur if the driver of such a machine had to deal with bottles thrown by spectators, while speaking to his pits and the other cars of his team and directing them on an unknown route!

It is making a virtue out of necessity to claim that, because the *S-Tank* has to stop to fire, this interrupted movement adds to the margin of safety. Cannot a turreted tank also stop and start at will? Moreover, since the gunner of a turreted tank is (or could be) tracking his target, he can tell the driver and the commander if he has a chance to hit it at a given moment, without finding out, when he halts, that a tree interrupts his final lay, or that a wall is in the line of fire.

With the stabilized sight of the *S-Tank*, its commander can track the target, and he can

then halt and slew, elevate or depress. But except on clear open ground, he may well have to move forward or sideways to enable the bore-line to clear an obstacle, adding to the engagement time. And if he stops in clear open ground, he is either supremely confident of his protective armor—or dead.

The *S-Tank* is successful only as an exercise, a step toward what we hope will be the future MBT. The low silhouette, the autoloader, smaller envelope and lighter weight of the *S-Tank* are devoutly to be wished by all the tank men. But not at the expense of a traversable gun.

N AYLIFFE-JONES

Ashted, England

Christie Suspension?

Dear Sir

A few years ago at the 84th Annual Meeting of the Armor Association, a *T-59* medium tank (Chinese version of the Soviet *T-54*) was presented for static examination. A group of armor officers commented, as they directed their attention to the large road wheels, that the *T-59* employed a Christie suspension system. A few years earlier, in 1971, John Milsom's *Russian Tanks: 1900-1970* was published, and in discussing suspension systems in Soviet medium tanks (*T-44*, *T-54/55* and *T-62*), he made reference to the suspension system employed as modified Christie type, torsion bar. During the 1975 Annual Armor Conference *T-62* Briefing (published in the November-December 1975 issue of *ARMOR*), First Lieutenant Michael W. Ryan made reference to "a Christie suspension system" that was utilized in the *T-62*'s.

These comments are very deceptive since they do not reflect exactly what the Christie suspension system entails. Green, Thomson, and Roots, *The Ordnance Department. Planning Munitions for War* (Washington, OCMH, Dept. of the Army, 1955) wrote about the mistaken identification of Christie's helicoil suspension system as opposed to the torsion bar suspension. They were quite right. J. Walter Christie never employed the torsion bar suspension in his vehicles and designs. His last design, drafted with his son, J. Edward, during World War II, displayed Christie insistence in keeping with the helicoil principle. The road wheels were smaller than in his earlier vehicles, and for the first time, return rollers were implemented in the design. The vehicle, an airborne gun carriage, *M-1950*, never went beyond the drafting stage.

Since 1928, Christie had stayed with the helicoil suspension principle. He purchased the coil springs from the Railroad Spring Company who made the springs (chromium-vanadium type steel for tougher

antifatigue cross land locomotion purposes) for numerous railroad companies. The "Coil Spring Knee Action Suspension," as Christie preferred to call it, was designed to allow maximum compression amplitude of plus 11 inches to minus 3 inches for each road wheel which, independently, was mounted upon a pivoted arm which was linked separately to a long adjustable helicoil spring positioned vertically between two side armor plates. This arrangement, with some modification in helicoil positioning would be evident in all Christie's vehicles and designs until his death in January 1944.

Shortly before World War II ended, the British dropped the Christie system and began using Horstmann type in their *Centurions*. The Soviets also dropped the Christie system with *T-34/85*, and with the *T-44* employed the torsion bar type. The problem is that there exists today a marked confusion between Christie's "Coil Springs Knee Action Suspension" and the torsion-bar type. Perhaps this is due to the large road wheels used on current armored vehicles which Christie began using in his self-propelled gun carriages shortly after World War I. One mode to utilize so as to properly evaluate the effectiveness and cost of any suspension system of an armored fighting vehicle is true identification and nomenclature of the support between road wheels and body. There is a mechanical difference between Christie's helicoil system and the bar-across-the-hull type. The question to ask is what major powers manufacture tanks utilizing Christie's helicoil system and which manufacture tanks employing the torsion-bar type. Then perhaps the superficiality of tank suspension can be placed in its historical perspective and those that developed it be given proper credit.

GEORGE F. HOFMANN

University of Cincinnati
Cincinnati, OH 45221

Gotcha!

Dear Sir

Due to the great demand to read issues of *ARMOR*, I am often late in the pecking order of this establishment to read and enjoy each and every issue. Such is the case for the September-October 1975 copy which came to hand recently.

May I first of all say how much all Canadian Armour personnel enjoy your publication. This particular issue is one of the best yet in my view.

Now that I have you set up with plaudits, I do have a "gotcha" in Major General Donn Starry's article on Tank Design. I will probably be the only one to pick this up, due to my advanced age and 35 years of service in

Canadian Armoured units. In the section on British tanks, you have a caption *Infantry MK I (MATILDA)*. The tank shown is the *MK I INFANTRY* which mounted a .303 Vickers machinegun and was fought in France in 1940. It was called the *Mark I or I* tank. The *MATILDA* was the *MK II* version. It was a bigger tank, 26 tons as opposed to 12 tons, with the same concept of heavy armor protection as for the *MK I*, but the *MATILDA* mounted the 2-pounder (40-mm) main armament and a .303 Vickers machinegun. The *MK II* version substituted the Besa machinegun for the Vickers.

P.V.B. GRIEVE
Brigadier General

Kingston, Ontario

Choosing Armor

Dear Sir

As you are aware, branch selection by all ROTC cadets attending universities that offer a general military curriculum is a decision that must be made early in their senior year. Our approach here at the University of Arizona is to make the junior cadets aware of the missions and career opportunities that are offered by the different branches of the Army through a writing requirement. A paper written by Cadet Charles Weeks to fulfill the requirement, in my opinion, offers considerations and rationale that may assist other ROTC cadets who will be faced with the far-reaching decision concerning branch selection.

GERALD E. RUTLEDGE
Lieutenant Colonel, CE
Tucson, Arizona 85721

We agree with Colonel Rutledge's evaluation of Cadet Weeks' essay and are publishing parts of it herewith. Ed.

My choice of basic branch is Armor. Armor has the responsibility for the development and conduct of mobile warfare. Contemporary Armor and Cavalry tactics incorporate cohesive and aggressive emphasis upon mobility, firepower, and shock action to overcome an enemy force.

Armor has proven its value and importance on all types of terrain. Witness the employment of armor in South Vietnam, once thought to be unsuited terrain for the use of armor. Near the end of U.S. troop participation in Vietnam, armored units, both ground and air, comprised over 54 percent of the total combat maneuver forces, and were the last units to redeploy to the United States. The addition of the attack helicopter squadron and the Air Cavalry combat brigade to Armor have increased tremendously the reach and capability of armor to destroy the enemy. Actions involving armor usually determine the outcome of

combat operations. Armor is known as the Combat Arm of Decision.

The Armor School at Fort Knox offers the Armor Officer basic and advanced courses, and other specialized courses. In the Motor Officer Course, which lasts 8 weeks, the students receive meticulous instruction in maintenance management, supervision and inspection of vehicular maintenance and repair procedures, and the complex materiel requirements of Armor/Cavalry field operations.

Among the opportunities open to a second lieutenant in the Armor Branch is the command of an Armor platoon. The officer is responsible for millions of dollars of equipment and its maintenance, supply, athletics, discipline, the training of his troops, and public relations as it pertains to his platoon.

Its mission of development and conduct of mobile warfare allows Armor to play a devastating role on the battlefield. Field Artillery and Air Defense Artillery may be argued to have more firepower, but they are limited to a role essentially supporting the offensive moves of the maneuver arms, i.e. Armor and Infantry. Since I wish to be part of the actual maneuver team, this further narrows my choices to Armor and Infantry.

Emphasis upon firepower, mobility, and shock action make Armor the most effective maneuver arm.

Other important considerations are my personal feelings and opinions. First of all, I have always been impressed with the spirit of the Cavalry Officer. This spirit has been transferred to the officers of Armor, and I would very much like to be a part of and join in the "Armor Spirit." Second, a consideration somewhat tied to the first, I greatly appreciate and find very exciting the concept of the Armor assault. Third, I would like to accept, as a challenge, the responsibilities given me as an Armor officer.

These reasons, the paramount importance of Armor in the offense, the responsibilities given the Armor officer, and my personal feeling and opinions, all contributed to my choice of Armor as my basic branch.

CHARLES WEEKS
ROTC Cadet

Tucson, Arizona 85721

Defensive Concept Questioned

Dear Sir

The account of Lieutenant Colonel Tamminen's briefing gives an interesting alternative to defeat in detail. However, it is possible to take issue with the projected defensive concept on two significant points. The first is the omission of the implications of time and space. The second, an apparent misappreciation of the Soviet's conception of "mass."

The Warsaw Pact's ground forces appear

to be located near their operational zones along the West/East border. U.S. and other NATO forces are not always sited in areas which allow a rapid deployment at the start of hostilities. It is usually predicted that warning of a Pact attack would be indicated by a deterioration of the East/West political position, reinforced by information from sophisticated reconnaissance means. But even in this case, the Pact retains the initiative if NATO is not to launch an attack. The U.S./NATO force is almost certain to be unable to move before a Pact advance has started for purely political considerations. NATO is therefore at a disadvantage if it is to be initially on the defensive. Indeed this would be the case, even if both forces had the same 'H' hour.

The frontage and depth of a U.S. division's area and the strength of the covering force are not mentioned in Colonel Tamminen's account. However, the bigger the area, the thinner the covering force, and the more chance of alternative defensive positions being required. Mobile defense depends on each of these defensive positions having coordinated fire support. Even if each position is selected and reconnoitered, time will be needed to physically prepare them and coordinate available fire support. During this time, the Warsaw Pact force is able to move forward. There is little chance of any available covering force being strong enough to do anything except fight a withdrawal, even in the best possible case.

Next, an examination of the word "mass" is necessary. As stated in Major Dagnault's threat analysis, the Warsaw Pact appears to be prepared to take high casualties to achieve their objectives. This is not to suggest, however, that the Soviets resort to "steam roller" tactics. Reconnaissance is carried out at all levels up to 50 kilometers in front of the moving columns of the main body. Specialized reconnaissance units, which are tasked to seek NATO thrust lines and positions, are reinforced by tank and motorized rifle companies clearing regimental routes and reporting the terrain. It can therefore be predicted that when forces meet, the Soviets will be in possession of a great deal of tactical intelligence. They will therefore be balanced to fight the meeting engagement.

Although not mentioned in Colonel Tamminen's article, the meeting engagement is designed to seize the initiative and destroy NATO forces while they are still moving. The Soviets consider success will attend the first force to deploy and attack without lengthy preparations. In all probability, it is the projected covering force which will be required to fight this battle. It is at this point that the great concentration of force by the Warsaw Pact will occur. The "Breakthrough" operation will be aimed at the specifically identified weak point after the covering force has either been destroyed

or thrown badly out of balance.

In summary, it might be stated that, though a step in the right direction, the mobile defensive concept put forward by Colonel Tamminen is only a practical proposition if it is in position from the start of hostilities. Even in this case, the title of the briefing is probably too strong. What the mobile defensive concept may achieve is time to use tactical nuclear weapons against identified Pact concentrations once political release for such a step has been obtained.

A E. HEMESLEY
Major, British Army

Liverpool, England

"Gaining the Edge"

Dear Sir:

The value of armor was greatly enhanced by John Bahnsen's accurate perception of our training inadequacies in his January-February article "Gaining the Edge." It is writings of this nature that should relate to Armor officers at all levels. Until an Army level effort is instituted to promote Colonel Bahnsen's ideas, there is an infinite amount of armor crew training that can be done at the unit and division levels. If tank crew members were given top stability priority within the division and battalion, and squadron commanders made every effort to provide greater training realism and accurate training assessments, the Army would have taken a giant step toward "Gaining the Edge."

WILLIAM P. GILLETTE
Lieutenant Colonel, Armor
Norfolk, VA 23511

More On Pershings

Dear Sir:

As a professional military and technological historian, I am another satisfied reader of *ARMOR*, however, *** I would like to make a comment on *** "Pershings for Normandy" (*ARMOR*, September-October 1975). *** Captain Bailey did an excellent job as far as he went, but I don't think he went back quite far enough. To really understand the story of what happened in the T-20 program, you have to look back to the 3-inch Gun Heavy Tank, M-6 program since the M-26 Pershing evolved out of it.

Basically the M-6 "Supertank" program officially began to develop a 50-ton tank, and was authorized in May of 1950. The T-1 prototype rolled out of the Baldwin Locomotive Works in the summer of 1941, testing began in August of that year, and the Army accepted it 8 Dec 1941. The Supertank weighed 63 tons and could run about 27 miles per hour since it was powered by a

1,000-horsepower aircraft radial engine! In May 1942, it was standardized as the *Heavy Tank, M-6*, and production was authorized.

Then the users, all of whom had originally been ecstatic over the M-6 heavy, took another look at it. It was twice as big as any other modern tank in the world at the time (early 1942), and too big for any U.S. bridging gear, landing barges, etc. Production stopped after only 41 were built! And this included experimental production variants. After being used as public relations pieces and for limited tactical experimentation, the M-6 heavies were relegated to storage, and they were declared obsolete in December of 1944.

It was in the light of the M-6 heavy tank program that the T-20 heavy tank program was carried out, and the rejection of the M-6 influenced the Ordnance Department's stress on the T-20 program adversely. Both the Armored Force Board and the Army Ground Forces Command had rejected the M-6 heavy, and neither was too enthusiastic about the T-20 as they saw it prior to late 1944. Although the M-6 heavy tank was an important technical achievement which contributed much to later U.S. Army tanks, it is almost forgotten today because it never was much used or committed to combat.

I hope Captain Bailey will take this as a comment on what he said. I have dug out the complete development of U.S. tanks prior to and through World War II in my work, and I am always surprised at how little of it is known.

KONRAD F. SCHREIER, JR.
Los Angeles, CA 90024

Tank Gunnery

Dear Sir:

This is in reply to "Tank Gunnery Under Fire!" by Lieutenant Colonel Charles E. Honore' (*ARMOR*, September-October, 1975).

You bet your commission everyday as a commander, and I can think of no better reason than tank gunnery.

In 1961-2, people in other USAREUR divisions said Table VIII was too hard and unrealistic; but General Abrams' 3d Armored did well, in particular 2-13 Cav and 2-32 Armor of CCA, commanded by Colonel Michael S. Davison.

In 1972-5, the 4-69 Armor of the 1st Brigade, 8th Infantry Division shot well because they planned, trained, and maintained to do the job. That covers the old and new tables under two commanders.

Tank gunnery is a science and an art; a science of many techniques and procedures, and an art to get crews to follow them faithfully and accurately.

General Abrams stated that the Table VIII TCQC was the best and most challenging test outside of combat. He also required each and every TC to shoot and qualify his tank. I still buy that and I am for improving tank gunnery, but anyone who wants to take the pressure and competition away from tank gunnery, to make it into just an enlarged pistol range, doesn't understand what useful competition and pressure mean. The fact that each tank crew in the battalion, commanded by a lieutenant colonel, major, captain, lieutenant, E-7 or E-6, must undergo annual training and qualification gives armor units an advantage no other combat arm has. Armor commanders keep close to the fundamentals and prove by example.

You get paid in tank units to shoot tanks and hit targets. If a commander, be he tank commander, platoon leader, company commander or battalion commander, after sufficient training cannot do this, then he is not qualified for his job and should find other employment. There may be some exception to this for abnormal situations, but for the norm, it is train-train-train, then produce-produce-produce. Our division shot all of its tanks and crews for 3 years. As a commander, you were not graded on how many tanks you qualified, but on the effectiveness of your entire program.

Home station and Tables I-VII are for training. Table VIII is for producing. That was my philosophy as a company and battalion commander, as well as that of my successor, Lieutenant Colonel David Schlieper. We produced the results because the soldier-tankers understood the goal and worked to achieve the results. We trained ourselves at home, at Baumholder, and on Tables I-VII at Graf. We were happy to have an outside division source grade our tankers for qualification. It was fair, firm and honest. A limited number of tanks had to shoot twice to qualify on Table VIII.

To be successful in such a tank gunnery program, you have to have everything together—discipline, training, maintenance, and administration.

The only excuse for having armor units is to shoot and hit targets. That means qualification in peacetime and success in battle at war. Tank gunnery incorporates all the basic missions of armor units—move, shoot, communicate, and maintain.

Bruce Clark's philosophy was "Are you willing to risk relief for producing mediocre results?" Your unit won't produce mediocre results if proper attention is given to planning, organizing, and supervising of all the tasks of tank gunnery.

DALE K. BRUDVIG
Lieutenant Colonel, Armor
Carlisle Barracks, Pennsylvania 17013 □

Pages from the Past

FEAR

The successful leader will teach his men to recognize and face fear, because fear is the enemy of morale; fear unchecked will lead to panic, and a unit that panics is no longer a unit, but a mob. There is no sane man who is altogether without fear, but with high morale, men will face danger, if not willingly, at least stoically, because of their ingrained sentiments of duty, of courage, and of loyalty, and because of their sense of pride in their country, in their unit, and in themselves; in other words, because of their esprit de corps.

**The Cavalry Journal
July-August 1945**

WORK DETAILS

The troop had perfected an organization that worked most satisfactorily. The squads were assigned to duty by roster; two squads (one platoon) furnishing the camp guard, one squad camp police, one squad stable police, etc., the roster being arranged so that the duties fell to each squad in turn.

After muster into the United States service, this system was changed to the regulation system of alphabetical detail with very unsatisfactory results. Under the old system there was a strong spirit of rivalry between the squads, each squad striving to do its work better and quicker than the other. The result was a camp and picket line that was almost painfully clean. Besides this, every man knew when and where his work was for the day, and when it was done, felt at liberty to make himself

comfortable, or attend to his personal duties. The corporals having continually the same men under them could organize their squads so as to apportion the work to individuals in a way to best suit their strength and capacities, and could enforce a better discipline. Moreover, as the work fell to each squad by roster, the first sergeant was relieved of all labor of making out details, etc., and was allowed to give his attention to his other duties already sufficiently onerous.

**The Cavalry Journal
September 1899**

THE SUVOROV TRADITION

The Russian art of attacking and breaking through enemy lines has its own history, traditions and theory. The Red Army is educated in the tradition of the great General Suvorov. It has made a serious study of Brusilov's offensive operations, and is now creating its own unsurpassed models of attack and break-through under modern conditions.

The Red Army's art of the break-through is based on clear, simple principles: the precise demarcation of operative and tactical tasks, the organization of interaction between troop units on an operative scale and between the Army services on a tactical scale. All this is based on flexible maneuvering, which is widely applied on both an operative and a tactical scale.

For instance, the capture of Kiev was achieved by a bold flanking maneuver. A little time ago, the same maneuver ensured the capture of Rechitsa. Their maneuvers invariably bring the Soviet troops to the enemy communication lines . . . The fear of encirclement forces the enemy to abandon one line after another

**The Cavalry Journal
March-April 1944**

REQUIEM

Down beyond the trees there is a quick, yet noiseless, movement, then the earth trembles with the sudden concussion; gun after gun the battery booms its parting salute to the General-in-Chief. A few low-spoken words from the aides-de-camp and the throng falls back to the very crest; the smooth green carpet of the slope is now one great unbroken square, save for that narrow cleft in its fair surface, bordered by those ridges of new-turned clods. Another stir and rattle down beyond the trees and then as

suddenly the leaves all leap and quiver as a flashing volley shoots aloft — another — another, and the pale blue clouds come drifting slowly up above the foliage, and then — last scene of all — there appears at the head of the grave one silent, statuesque, solitary form, clad in the full dress uniform of the trooper. A moment's pause until the echo of the final volley has died away in the distance and then he raises the trumpet to his lips. Soft, tremulous and low as we have heard it many a time in windy nights on the far frontier, and in mountain bivouac in the old campaigns, the first notes of "taps" float out upon the hushed and pulseless air; then louder, throbbing, wailing, well-nigh passionate, it thrills through every heart — a sobbing requiem, the trooper's one adieu to a cherished comrade, then, sinking, fading, falling, it slowly dies away and all is done. The cavalry bade the last good night to Sheridan.

**The Cavalry Journal
November 1888**

SO WHAT'S NEW?

In reply to your note of July 31st. I fully agree with you that three years is too short a time to make a cavalryman. I see no reason why at this time, when we are undoubtedly to be compelled to take a leaf here and there from the experience of other nations, we should not adopt their plan of giving higher pay to the cavalry than to the infantry. Requiring some knowledge of horses and riding, and selecting recruits carefully, we could soon build up a corps d'elite whose men would do as much in three years as the men we are getting now would do in five. Why should there be any demur at paying the trooper more than the footman when he is required to know everything that the footman knows, and his horse work besides? Then again, his daily labor is twice that of the infantry when we consider the care of horses and extra work on horse equipment and weapons. It seems to me that much might be done in the way of improving the condition of the trooper, the cavalry could be treated as special troops whose whole effort was to be concentrated on their special duties; their clothing could be cut to fit and to adapt it to mounted use—a thing that has never been done in our service; and in many ways the cavalryman could be compensated for the greater efforts, greater abilities and greater knowledge and training required of him

**Frederick S. Foltz
Captain, Second Cavalry
The Cavalry Journal
September 1899**

USE OF TRUCKS QUESTIONED

Of course I do not pretend to believe that automobile trucks will take the place of the long line of wagons which painfully follows an army on the march, transporting everything needed to feed the soldier; but I would like to see every regiment have one or two regimental automobiles, carrying enough supplies to last for a day or two. What does happen? A train marches at the rear of the column. As long as you are advancing, everything is all right; but when the battle begins, if you are afraid of having to retreat, the first thing you do is to send the train ten or twelve miles to the rear, partly to clear the roads for the troops in case you do retreat, partly to prevent your supplies from falling into the hands of the enemy. Then what happens? If the fortune of war is with you; if, instead of losing ground you gain, if you have advanced six miles, for example, at the end of the day you find yourself sixteen or eighteen miles from your supplies, and you cannot feed your men. These difficulties would be easily avoided with the system that I propose, if each regiment carried on automobiles only those articles absolutely necessary for guaranteeing one day's supplies. After these are distributed, the automobiles go back to the reserve supplies to get what is needed for the next day, and the troops would never run the risk of going hungry—a thing which used to happen all too often, alas, under the old system.

**The Cavalry Journal
July 1905**





THE COMMANDER'S HATCH

MG JOHN W. McENERY
Commandant
U.S. Army Armor School

CHANGES IN TANK GUNNERY

One of the first questions asked of me as I took over the Armor Center was whether I would write an opening article for *ARMOR* and, if so, what would it be called. The answer was yes and that I would continue the tradition of the Commander's Hatch as established by Lieutenant General Donn Starry who has done so much to vitalize the entire Armor community and to make the Armor School the most progressive in the Army.

For this first article I want to discuss the vital subject of tank gunnery. You'll note some significant changes from our current gunnery tables. This is an interim step until we can develop and thoroughly test a gunnery system that maintains tank crews at the highest practical level of proficiency throughout the entire year.

New Tank Gunnery Tables

Our current tank firing tables have some significant shortcomings. First, they are extremely costly in terms of ammunition and range facilities required—about \$23,000 per tank crew per year for ammunition alone. Adding fuel, gun tubes, spare parts, and range maintenance, the cost may be closer to \$35,000 per crew per year, a figure which could well double in the near future. More important than cost is the fact that for many units our current tables don't get the job done! Existing tables are predicated primarily on the availability of main gun range complexes. Many active and reserve units have neither main gun tank ranges nor time to fire as frequently as required, and gunnery proficiency cannot be attained or maintained year round. Current ammunition tables of allowance, driven by the cost factor, do not allocate enough ammunition to fire more than a few times a year—yet crew turbulence requires more frequent firing to maintain proficiency levels.

In examining the current tables with the ultimate goal of reducing costs while providing better training, these ground rules were followed:

- Conduct meaningful, realistic, challenging gunnery training and testing.
- Train and test progressively the required firing skills, repeat where possible.
- Conduct monthly firing.
- Fire more subcaliber at home station.
- First fire all tables, less qualification table, with subcaliber ammunition.
- Use cheaper main gun round where possible (HEAT TP-T at \$110 vs. APERS at \$488).
- Reduce warm-up rounds and zeroing rounds.
- Determine ammunition requirements for year round firing.
- Give commanders the option of selecting from a family of subcaliber devices and scaled-down targets.

Analysis has indicated that some of the old tables should be retained, some eliminated, some combined, and some new ones added. Major recommended changes include the introduction of scaled-down firing, the reduction of main gun ammunition, and an increase of subcaliber ammunition.

Current Tables I, II and III will be retained for exercising new gunners, but they will be modified to permit practicing methods of adjustment such as *standard range change*, *target form* and *burst-on-target* (BOT). Because of the higher velocity tank ammunition, crewmen can no longer count solely on BOT adjustment to do the job. Using the *M-55* laser or a subcaliber device (.22 caliber), these tables are inexpensive and can be fired at any home locale.

Scaled down stationary and moving targets will be used in three new tables which call for fixed tank, moving tank and platoon firing exercises. Target scale (either 1/60, 1/35, or 1/20) and the size weapon used are governed by available real estate while the *M-55* laser can be used by units which have no impact area.

Some advantages accrued by scaled-down ranges are.

- Small areas are required
- They can be fired cheaply and frequently at or near home station

—Crew proficiency will be maintained and enhanced between periods of main gun firing.

—Innovative design can lead to scaled-down ranges closely resembling actual environmental battle positions and anticipated target arrays which would be too expensive to

their zero. The other is the requirement that zeroing data be entered in the tank's logbook.

New Table VI, the first main gun table, is to be a combination of old Tables IV and V (stationary target/moving target) but with half the number of main gun rounds re-

COMPARISON OF TABLES

CURRENT	NEW
I Subcal—zeroing/manipulation/range card	I Same
II Subcal—adjustment of fire—stationary targets	II Same
III Subcal—adjustment of fire—moving targets	III Same
IV Main gun—stationary targets	IV Scaled-down range (single tank) Stationary tank/stationary and moving targets
V Main gun—moving targets	V Scaled-down range (single tank) Moving tank/stationary targets
	V(P) Scaled-down range (platoon) Stationary tanks/stationary targets
	ZERO Main gun/machinegun
VI Main gun/stab—stationary/moving targets	VI Main gun—stationary/moving targets
VII Main gun/machinegun combat course	VII Main gun/machinegun combat course
VIII Main gun/machinegun combat course (qualification)	VIII Main gun/machinegun combat course (qualification)
IX Section battle run	IX Platoon battle run
X Platoon battle run	

Note. Tables above line are fired at home station.

duplicate on a full-scale basis. Considering the limited number of occasions when USAREUR tank units have occupied, far less fired from, assigned battle positions, the value of such realistic training is particularly significant.

Currently, a zero is established at the start of Table IV and confirmed prior to Table VIII. Since this extensive zeroing is not practical under combat conditions, it is unrealistic during training. Under the new arrangement, zeroing will be a separate table performed *only* when the previously established zero has been lost—main gun tube changed or the fire control equipment removed. When tanks *must* zero, more rounds are allocated to zero the secondary as well as the primary sight. Allocated zeroing rounds that are not used are awarded to commanders as a bonus to be used on the more advanced tables. To encourage firing from previously established zeros, two actions have been initiated. One is the development of a *zeroing data plate* to be installed in each tank which will provide tank crews a formal place to record

quired. Depending on the ranges available, the stationary/moving target engagements can be intermingled and engaged on the same range, or the stationary targets can be fired on one range and the moving targets on another.

The new Tables VII and VIII will be virtually unchanged from current ones, except for fewer main gun engagements. The more difficult type engagements such as moving tank/moving target are retained.

The section battle run, which did not employ the overwatch principle, was eliminated because the exercise was viewed as tactically unsound. Instead, Table IX will require a platoon battle run wherein many engagements will be by section, utilizing the overwatch principle. By eliminating the separate section exercise, ammunition is now available to conduct the platoon battle run both day and night.

The new tables permit more firing on established ranges as well as at home station—but with less cost, as the chart following indicates.

ANNUAL FIRING REQUIREMENTS/BATTALION

CURRENT					
	TABLES I-III	QUALIFICATION IV-VIII	TABLE IX, X	INFORMAL ARTEP	FORMAL ARTEP
Number of Times	2	1	0	0	0
Cost per BN (54)	\$933.12	\$1,336,445.10	0	0	\$39,106.95 (15 Tanks)

NEW							
	TABLES I-III	SCALED-DOWN IV/V/VP	QUALIFICATION ZERO-VIII	TABLE IX SUBCAL	TABLE IX SERVICE	INFORMAL ARTEP (SUBCAL)	FORMAL ARTEP
Number of Times	4	3	1	1	1	1	1
Cost per BN (54)	\$1,866.24	\$2,349.00	\$716,761.46	\$5,248.80	\$141,624.72	\$5,248.80	\$37,996.20 (15 Tanks)
TOTAL CURRENT COST \$1,376,495.10				TOTAL NEW COST \$911,095.22			
Costs are in FY 76 Dollars							

Notice that the current tables permit just *four* annual firing opportunities as opposed to 12 opportunities for the new. Under the new arrangement, commanders have the flexibility to modify tables to meet their unique situation—expected threat, available facilities, available time, and status of training. In addition, sufficient ammunition will be allotted to fire each table (except Table VIII qualification) in the subcaliber mode. Ammunition will be specifically allocated for the platoon battle run instead of coming from the savings (first-round hits) from Tables VII and VIII. Including ARTEP Level 1 firing, 133 main gun rounds are required for the new tables as opposed to 173 for the old.

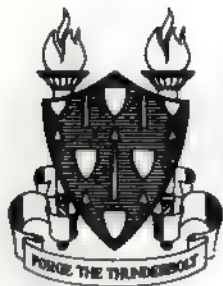
Development has begun on scaled-down targets that permit using both live subcaliber firing and the M-55 laser. A control box powered by the tank's 24-volt system will activate up to 30 scaled-down popup targets. That number was selected so that on the new Table VP target arrays can outnumber the platoon firing the table. For moving scaled-down targets, the mechanism described in TM 17-12-6, "Field Mini-Tank Range Complex" can be used.

Work is also underway on a number of subcaliber devices, many of which should be available to be used to fire scaled-down as well as subcaliber tables. The M-16 rifle and caliber .50 M-2 machinegun (Telfare) devices are promising. These strap-on devices are attractive in that the weapons are readily available in Armor units and the mountings can be fabricated by local TASO's or direct or general support maintenance units. The .22 caliber rimfire insert to be fielded in 1977-1978 will give the M-16 rifle a .22 - caliber or 5.56-mm capability. The M-55 laser, currently in the inventory,

rounds out the options from which the commander can choose. This device can be satisfactorily used on Tables I-V by units which have no impact areas at their home location.

In the near future USAARMS will publish TC 17-12-7, "Subcaliber Devices and Scaled-down Ranges." This TC will list the gunnery training devices now available, and provide plans and range safety diagrams for subcaliber devices, scaled-down targets, and scaled-down ranges. With this TC, the unit commander can better assess his home station gunnery training situation and identify and obtain the hardware he needs to establish the home station ranges which best fit his situation. Our objective is to develop *year-round tank gunnery proficiency* through year-round tank gunnery practice—and to do it at less cost than our current tank gunnery tables





FORGING THE THUNDERBOLT

Army Oil Analysis Program

Formerly known as the Army Spectrometric Oil Analysis Program (ASOAP), the Army Oil Analysis Program (AOAP) as outlined in AR 750-43 is a coordinated effort throughout the Army to detect impending equipment failure by periodically sampling and analyzing oil from designated equipment. Army aircraft have been under this program for some time, but recent decisions have been made to include certain items of Army ground equipment under this same program. TB 43-0210 dated 28 August 1975, provides instructions and procedures for the operation of the AOAP for ground equipment.

Oil analysis for ground equipment will provide the commander with another diagnostic tool in his maintenance program which will enable him to determine the internal condition of engines, gearboxes, transmissions, and other oil lubricated systems and components. The oil analyst, by early detection of a critically high concentration of metal particles or dirt in the oil, can provide the commander with recommendations for corrective action before a component failure occurs or other costly repairs are required. Preliminary results reported by units taking part in the Breakdown Maintenance Test at Fort Riley and Fort Campbell have shown that analysis of the oil from *M-113*'s and *M-35* trucks can save thousands of maintenance dollars.

The current TB contains the information required to administer the AOAP on the engines used in the *M-60* and *M-48A3*-series tanks and the *M-88A1* Recovery Vehicle. This program will be extended to the *M-113*-series of vehicles in early 1976. Pertinent aspects of the AOAP will be brought to the attention of AOAC and Motor Officer students attending Armor School courses.

The Master Gunner

The Master Gunner program has been approved and courses will be conducted at the U.S. Army Armor School on a regular basis. The first regular course on the *M-60A1* began on 27 February 1976.

Over the next two years, USAARMS will train and graduate a Master Gunner of appropriate skill for each company/troop and battalion/squadron of Armor and ground Cavalry in the U.S. Army. Quotas for these courses will be allocated through major command headquarters (FORSCOM, USAREUR, etc.)

The concept for the Master Gunner was developed as a result of increased complexity of fire control, and the lack of advance gunnery knowledge in Armor units. Commanders frequently cannot personally afford the amount of time required to develop and implement their detailed year-round gunnery program because of their many other pressing requirements. Therefore, if every armored battalion/cavalry squadron and, eventually, every tank company/cavalry troop were provided a Master Gunner, the commander would then have a knowledgeable man to assist with the gunnery program. This would result in more proficient and capable tank crews. This is not an original concept; the British have used the Master Gunner concept with a great deal of success for a number of years.

Initially, USAARMS developed an abbreviated prototype course and tried it out locally. Based on the success of this trial course, approval was given to conduct three pilot courses (*M-60A1*, *M-551*, and *M-60A2*) during 1975 for further evaluation. Based on the favorable comments by field commanders, approval was given to conduct Master Gunner Courses on a regular basis.

The course is designed to train highly skilled NCO's as Master Gunners who will return to their units and assist the commander in preparing and implementing a year-round gunnery training program. In addition, the Master Gunner will be capable of assisting in supervising the program, troubleshooting the program, setting up ranges and teaching other leaders gunnery and advance gunnery techniques. By no means is the intent for the Master Gunner to replace leaders in the chain of command in training their crews, platoons, or troops, but rather to assist the leaders in this important task.

At present, the Master Gunner will be assigned by MTOE to positions at battalion/squadron and company/troop level. At the battalion/squadron level the Master Gunner is authorized an E-8 slot as either the S-3, Assistant Operations Sergeant or the S-2, Intelligence Sergeant. At company/troop level, the Master Gunner will be one of the E-7 platoon sergeants. Upon graduation from the course, the Master Gunner will be awarded an Additional Skill Identifier (ASI) to aid in personnel management.

The ASI for the *M-60A1* Master Gunner is C6; for *M-551*, C5; and for *M-60A2*, C7. The individual selected to attend the course must have two years retainability at the completion of the course. However, attendance at the course does not in itself guarantee a two-year assignment retention; therefore, personnel who are selected for the course should be selected relatively early in their tour. In the case of a short tour area, the man to attend the Master Gunners Course is

selected by MILPERCEN and attends the course prior to reporting to the short tour area

The *M-60A1* and *M-551* Master Gunner Courses are 12 weeks in length and the *M-60A2* Course continues for 14 weeks. The POI calls for about 35 percent of the total time for gunnery, emphasizing advanced gunnery techniques. During this time the student will fire all tank tables. About 35% of the course is dedicated to turret maintenance, since many of the gunnery problems are associated with malfunctions in the turret. This is not designed to make the Master Gunner a turret mechanic, but rather to insure that unit turret mechanics, and other maintenance personnel that basically have an automotive background, give the turret the attention that it requires. The Master Gunner, for example, should be able to tell the commander if turret mechanics know how to diagnose wiring circuit problems or if the PLL clerk is spending enough of the PLL funds for turret parts. The remaining 30% of the course will be on how-to-train tank gunnery, such as designing a tank gunnery program and laying out ranges. During much of the instruction the student will be tasked to teach the other students, using training aids that he can expect to find in his unit. He will be provided with his own tank gunnery library to help him instruct leaders when he returns to his unit. In addition, he will be on the USAARMS distribution list for updated materials related to tank gunnery so that he can keep his library current.

The Master Gunner Course is expensive. The *M-60A1* and *M-551* Courses have only 15 students and the *M-60A2* Course only 6 students. The student to instructor ratio will be three to one and two to one, respectively. The success of this program, in terms of how well the Master Gunner is able to serve his unit, depends much on the high motivation and quality of the student that enters the course. Certainly he will have to possess a good knowledge of basic gunnery. He will be tested on his knowledge shortly after he arrives at the course. He should be able to brief, instruct, and influence his superiors and peers. Upon return to his unit after the course, and from time to time thereafter, commanders will be asked to evaluate their Master Gunners as to how effective they have been in helping the unit's gunnery program.

FM 17-12 (Revised)

It's about time someone wrote a new tank gunnery field manual! How many times have you heard this comment from your fellow officers, NCO's and tank crewmen? The bible of tank gunnery is long overdue for a substantial facelift

It is apparent after reading the November 1972 edition of FM 17-12 (revised) that the manual is written basically for the Active Army main battle tank units. It is not current threat oriented nor is there much in it on "How to Train."

Tank gunnery is changing at a rapid pace — just count the number of gunnery articles in *ARMOR* Magazine, or review the endless line of training circulars written on tank gunnery in the last couple of years. *We are getting there!!!* Unfortunately, training circulars have a short lifespan. Additionally, tankers should be able to go to one reference and get what they need instead of a number of references.

The new FM 17-12 is different from previous versions. It is divided into three parts and a number of appendices Part I

is the introduction and describes the threat as tank crews are apt to see it. Part II discusses tank gunnery doctrine and principles that apply GENERALLY to all tanks in the Army inventory. When necessary to zero in on a particular tank to demonstrate a teaching point, the *M-60A1* tank is used. Part III contains the "How to Train" chapters. The Innovative Training Techniques chapter (chapter 18) suggests various training methods to train the required gunnery skills at home station with reduced resources. Part III also contains the tank gunnery firing tables discussed in this issue of the magazine.

Following the three main parts of the manual are a number of appendices — one for each type tank in the Army inventory. Each tank appendix covers the features unique to that type tank. Additionally, there will be an appendix on the Combat Engineer Vehicle (CEV).

The manual is quite thick in size; however, each unit WILL NOT get ALL appendices. Units will get ONLY the appendix on the type tank that it has unless the unit specifically requires the other appendices. Armored cavalry regiments will receive all appropriate appendices. Subject matter contained in the tank operator's manual is not repeated in this FM.

Other rather unique features of this manual are:

- Target audience for this manual will be the tank commander except for the "How to Train" portion (Part III) which is directed to the company and battalion planners.

- The manual will be highly illustrated to increase understanding.

- Relevant parts of most of the previously published tank gunnery literature will be included to eliminate the need to refer to several source documents.

- Looseleaf format will be adopted to ease posting changes.

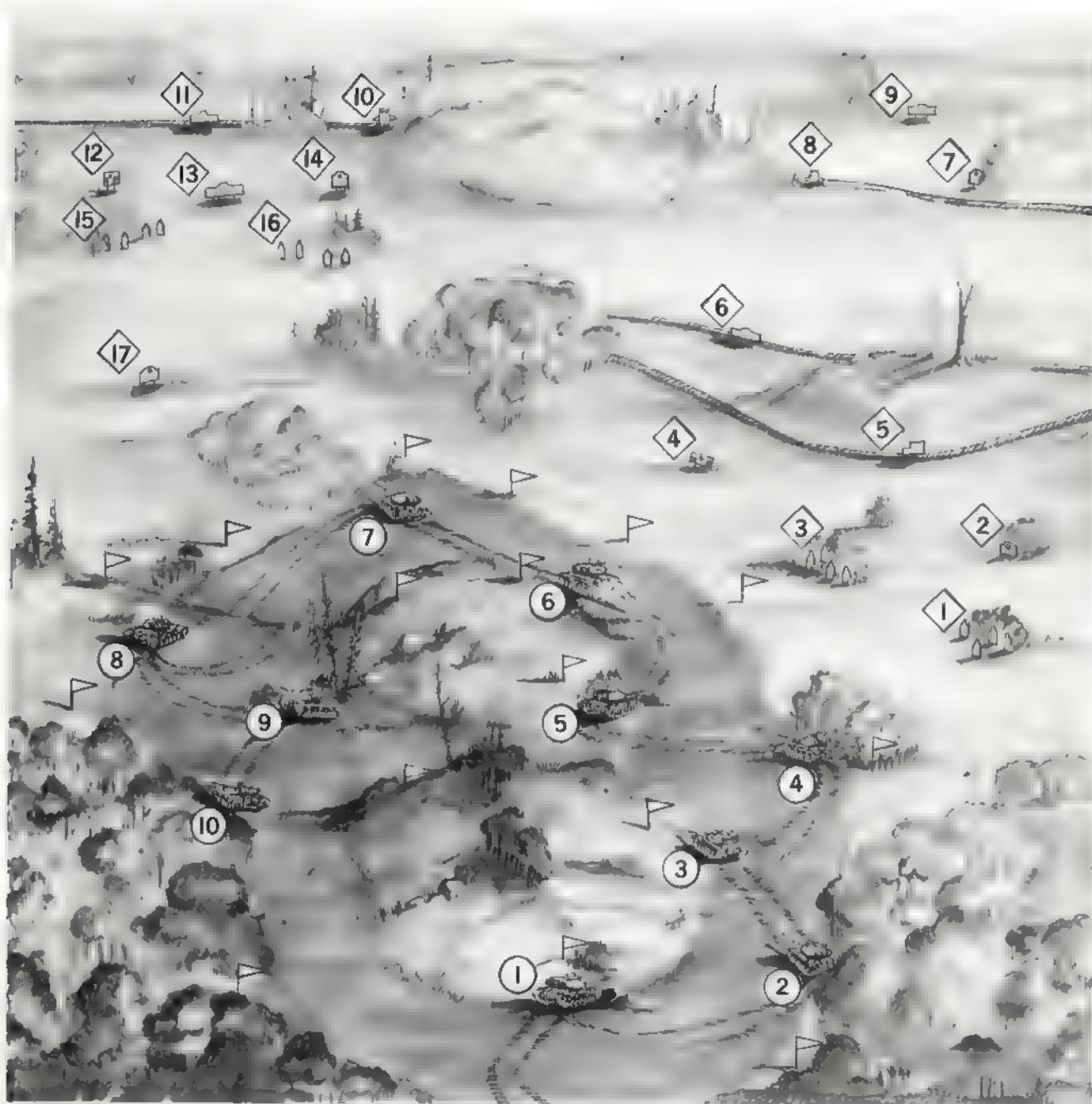
- Tank gunnery principles and teaching points will be highlighted in bold print to catch the eye of the reader.

- Key points of each chapter will be summarized.






- Tactics as it affects gunnery will be incorporated where required.

The following synoptic outline gives you an overview of the chapters and their contents.

CHAPTER	TITLE	HIGHLIGHTS
1	Introduction	-What the next war will be like. -Necessity to win the first battle outnumbered
2	Threat	-Discusses strengths and weaknesses of Threat equipment that US tankers are apt to see. -Places threat equipment that is likely to be seen in tactical scenarios
3	Gunnery Standards	-Establishes gunnery standards for tank crewman, crews, sections and platoons.
4	Prepare-to-Fire	-Emphasizes prepare-to-fire checks most frequently overlooked by the tank crew



LEGEND

ENEMY TANKS (HEAD-ON) 
 ENEMY TANKS (FLANK) 
 ENEMY ANTITANK GUN 
 ENEMY TRUCKS 
 ENEMY HELICOPTER (HEAD-ON) 
 ENEMY TROOPS 

POSITION	POSSIBLE TARGETS
1	1,3,5,7,8,9
2	4,6,9,10,11,14,16
3	1,3,4,5,6,8,9,10,11,13,14
4	4,6,10,11,12,13,14,15,16
5	1,2,3,4,5,6,7,8,9,10
6	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16
7	10,11,12,13,14,15,16
8	4,5,6,7,8,9,11,12,13,14,15,16,17
9	10,11,12,13,14,15,17
10	1,2,3,5,10,11,12,13,15,17

5	Crew Duties	-Outlines crew duties in general. (Specific crew duties are contained in each tank appendix.)			-A sample program for Reserve units as well as active Army is provided.
6	Target Acquisition	-Describes Threat target signatures and gives tips on how to detect targets. -A picture of all tanks, personnel carriers, and tactical type aircraft of all nations is included for identification training.	18	Innovative Training Techniques	-Recaps crew skills that must be mastered and gives suggestion on how to train and test these skills at home station with minimum resources.
7	Range Estimation	-Discusses simple methods to determine range to target without using the range finder. -Discusses the MIL formula in simple terms.	19	Skills Test	-Discusses skills test which replaces the Tank Crew Gunnery preliminary gunnery examination.
8	Firing Position	-Discusses hull/turret down, both stationary and moving. -Discusses primary, alternate, supplementary, and nuclear positions.	20	Tank Gunnery Tables	-Discusses tank gunnery firing Tables I-IX.
9	Direct Fire	-Discusses gunnery principles including fire commands, crew duties, methods of adjustment. -Discusses engaging multiple targets. (Specifics by type tank are discussed in each type tank appendix.)	21	Ranges	-Discusses how to set up and run a tank gunnery range.
10	Stabilization	-Discusses main gun engagement while moving using stabilization.			
11	Range Card and Indirect Fire	-Describes tank indirect fire equipment and how used to make range cards and fire indirect as artillery.			
12	Ammunition and Target Destruction	-Describes type of ammunition and when used. -Discusses possible tank ready rack stowage arrangements based on the type threat.			
13	Special Gunnery Techniques	-Discusses firing at unique targets. -Discusses firing at extended ranges.			
14	Machineguns	-Discusses when and how to employ the tank machineguns against various type targets.			
15	Platoon Fire Distribution and Control	-Describes platoon fire commands. -Discusses fire planning at the platoon level.			
16	Aerial Engagement	-Describes how best to engage jets, helicopters and airborne troops			
17	Armor Unit Gunnery Training Program	-Discusses the elements of a good annual gunnery program and how to construct one.			

Now that you have a general idea what this manual is all about, let's discuss part of the manual that perhaps is the most emotional part to tank crews — the qualification table — Table VIII. It is considerably different than previous Table VIII's, specifically in course design and engagement procedures. The illustration on page 13 gives you a birds-eye view of how Table VIII will be depicted in the manual.

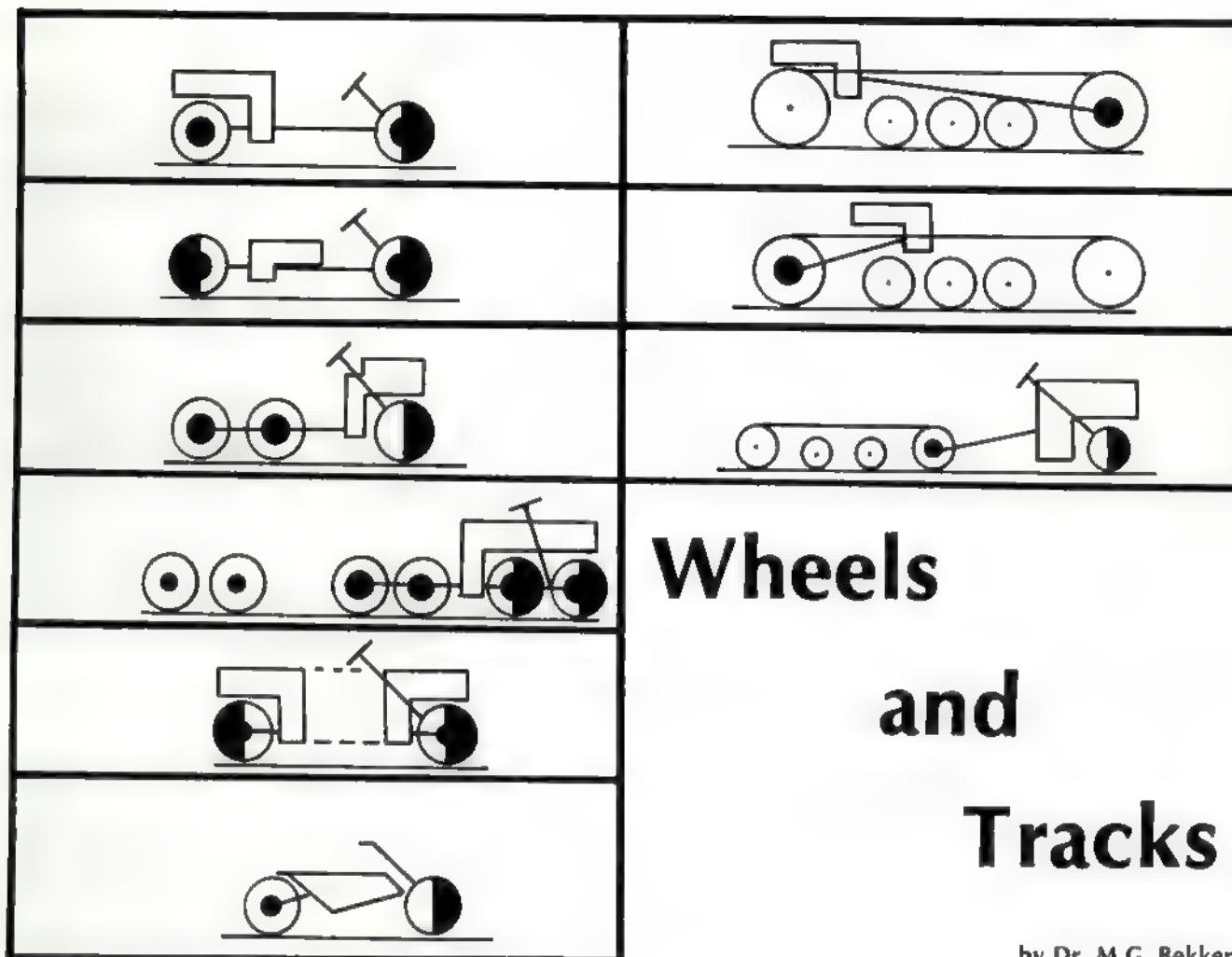
- Flags are used to assist tank movement in a sector — no course roads.
- Multiple targets (Threat) are presented as pop-up/pop-down stationary and moving targets.
- Threat targets displayed in more realistic tactical arrays.
- Moving targets will move at variable speeds and will disappear intermittently from the firing tank's view — ambushing the targets will be difficult if not impossible.
- More emphasis on indirect illumination — shell illumination, passive, IR.
- White light engagements will be scored on the daylight sliding scale.
- Ammunition conservation will be stressed.
- Crews will be evaluated on their use of terrain.

EXCELLENT	GOOD	SATIS-FACTORY	UNSATIS-FACTORY
100	75	50	0

The tank crew examiner awards points on this scale based on a subjective evaluation of these factors:

DID THE CREW?	YES	NO	REMARKS
Use concealed and covered routes?			
Move rapidly between engagements?			
Engage targets hull-down if possible?			
Use proper techniques of movement?			
Choose the route best supporting the maneuver (attack or ambush)?			

In summary, the new gunnery manual can be easily read and understood by all tankers. It addresses all tanks in the Army inventory. It stresses and suggests ways of training at home station to meet the threat. The finishing touches are being put on this long overdue gunnery manual and it should be available in the fall of 1976. □



Wheels and Tracks

by Dr. M.G. Bekker

Since June 16, 1860, when *LeMonde Illustré* published drawings of a motor vehicle with a Lenoir engine, automobiles have been built in millions, together with their derivative agricultural, commercial, and military vehicles. Nearly 100,000 patents, and a gargantuan professional literature followed.

A review of the state of this science and technology shows an evolutionary process from birth to maturity; one may even argue that an apparent senescence and decline have begun.

If so, we have been witnessing a complete life cycle typical of every technological enterprise, which, like the 19th-century venture in railroading, will not fit the approaching year 2000 without a radical change.

Against this background, a brief analysis of prevailing views and opinions, that alternately seem to shift the blame for "lack of progress" from the user to designer and vice versa, appears to be of interest. Such an analysis also may be useful in a separation of illusion from reality, and in the shaping of future developments.

Maturity of automotive science and technology speaks for itself from hundreds of books and thousands of papers produced in the international forum, by professionals and amateurs alike.

Their increasing preoccupation with detail and componentry, with the additive rather than substantial change, and with the increasing preoccupation with economy, environ-

mental impact, safety, scarcity of resources etc., is evidence that automotive locomotion "per se" is no longer a technical-scientific problem. Whatever the scientist and the engineer do now, seems to have to meet halfway the demands of their socio-economic and political counterparts who play an increasingly important role in automotive production.

No wonder, that in such a climate of technological maturity, once world-famous automotive research institutes and the prestigious chairs, or departments, of automotive engineering in our universities are either on the decline, or have been replaced with research and scholarly ventures that are driven by generalized disciplines.

A similar trend is seen in the declining number of scholars and engineers of national and international repute. Among today's distinguished professionals one hardly finds a Porsche, a Tsudakov, or a Kamm, not necessarily because of lack of intellect, but because of the narrowing field of potential action.

Basic theoretical and practical problems, and the methods of their solution, have been worked out in thermodynamics, applied mechanics, other engineering sciences, and in operations research. Thus, the science and technology of motor vehicles is a mature package of knowledge, and a gigantic bundle of practical knowhow, that has preempted most, if not all, surprises.

Therefore, innovations are limited almost exclusively to

new modes and uses of land locomotion in new emerging socio-economic, political, and strategic environments.

It is an illusion that more R&D will invent something better than a wheel and a track. In reality, the next step is up to the user, and to his ability to formulate new requirements which do not echo the past.

The growing maturity of the user, and his assumption of more regulatory powers, is thus entirely understandable.

The average user of an automobile, originally motivated by curiosity, sportsmanship and prestige, and then by the extravagance of styling and meaningless proliferation of "options," now faces the collapse of his illusions. As a result, he has started formulating real requirements for the future.

But, in the field of specialized motor vehicles used for construction, agriculture, mining, forestry, etc., little, if anything, has changed. As long as the specialized equipment is commercially competitive, it often remains economically and otherwise wasteful, thereby upholding Gresham's law that a bad currency drives a good one out of the market.

Mobile military equipment, which was born shortly before and during World War I by mounting armored boxes on Caterpillar (Holt) tractor chassis, and by using Parisian taxis in the battle of the Marne, still depends almost entirely on the basics of commercial automotive materiel. Hence, the formulation of basic requirements by the military user has followed illusory civilian patterns.

Formulation of requirements for specialized vehicles invariably lacks operational-environmental premises that include proper quantitative definitions.

The farmer, the lumberman, and construction contractor cannot tell what kind of tractor may approach an absolute optimum of cost-effectiveness in statistical terms, when it is operated over a specific soil mix and under their climatic and operating conditions. Consequently, they buy equipment on a relative basis of merit, a basis that is more often than not opinionated rather than rational.

This situation has resulted from lack of systematic soil measurements and statistical evaluations of climatic variations which are compatible with applied mechanics of ground locomotion. As long as this lack exists, engineers cannot rigorously optimize the design and performance of a vehicle that is to be used in a given environment that may range from the cold of the arctic to the heat of the tropics, and that may be required to perform missions ranging from reconnaissance to battlefield engagements.

Perhaps the user of construction vehicles is in a better situation because the environment of his operation is usually more stable and uniform. Whenever it is not, construction may be suspended. The operator of a municipal bus fleet certainly knows how to optimize power-torque-capacity characteristics of vehicles which are used for a flat network of widely spaced street blocks on one hand, and for hilly city streets with short-distance stops on the other.

All this, however, does not reduce the dilemma of the military when writing requirements for vehicles that ideally should move in all terrain and climate conditions, all the time, and with maximum dispatch. Which is best for a given purpose, tracks or wheels, or something else? There is no clear cut answer, only confusion.

Tracks or wheels? The question is like the ubiquitous sphinx, waiting for its Champollion to come along to

decipher the hieroglyphics—a perfect example of illusions cultivated even by professional people.

A chief engineer, who spent decades on R&D of military vehicles, recently publicly deplored the alleged loss of a unique opportunity to finally define the differences between the track and the wheel, when the R&D of two identical mission-oriented reconnaissance vehicles—one on tracks, the other on wheels—was cancelled before the project was fully completed.

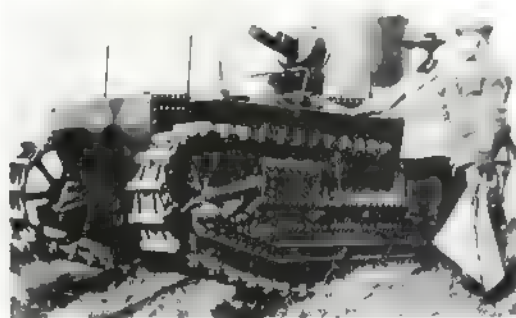
Obviously, the man could be blamed for the outcome and asked what he was doing during the decades when he was responsible for the solution of the problem.

However, the basic fault does not lie with the engineers because they possess, as previously discussed, a mature knowhow. They have mastered the theory of land locomotion and acquired all of the pertinent practical experience.

The problem is that the track versus wheel dilemma is operationally and technically insolvable as long as appropriate soil characteristics and operational specifications remain undefined.

If the user does not quantitatively tabulate data as to where, when, and how he wants to go, while defining mechanical properties of the soil and their *spatiotemporal variation* within mission constraints, the designer cannot meet the user's qualitative and/or unwritten ambiguous conditions.

Even Then



THE business of designing fighting machines for ground troops has received far more attention from automotive engineers than from those who use the machines. Unfortunately, the engineers are not fully conversant with the needs of the troops, and are prone to over-emphasize mechanical features. As a result, we find machines that are mechanically correct, in which the driver cannot see and the gunner cannot shoot. Mechanical perfection is of little use if the completed machine lacks fighting ability; hence, there is need in the design of fighting machines to shift the emphasis from mechanical to tactical features.

The Cavalry Journal
April 1929

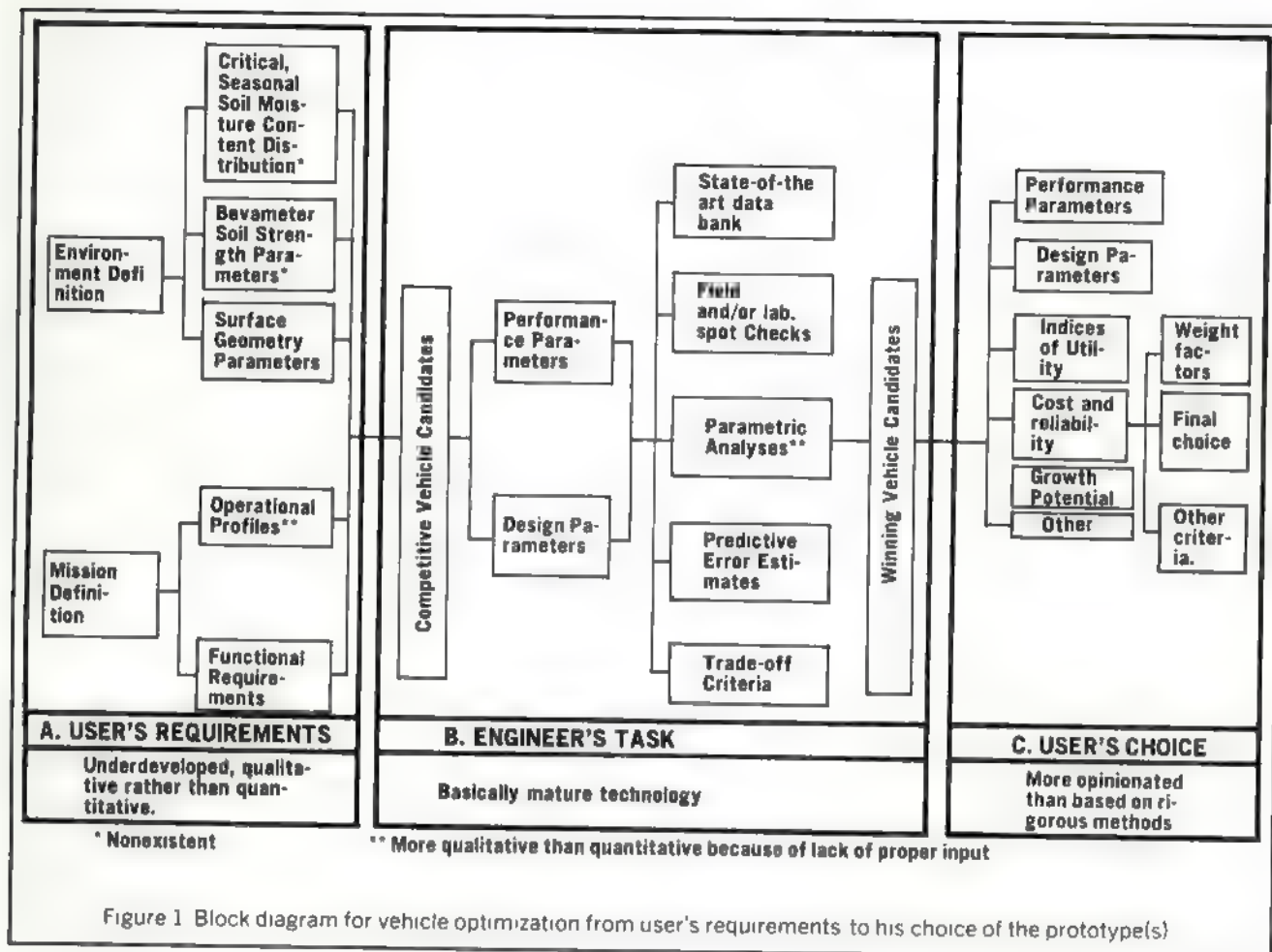


Figure 1 Block diagram for vehicle optimization from user's requirements to his choice of the prototype(s)

It is thus an illusion that technology will provide answers. Technology has the methodology and knowhow. The key to future developments of specialized motor vehicles lies in the improved quality of the user's specifications for the mission and environment.

Solution of Ground-mobility Problems

The following example illustrates, in a simplified manner, the basic methodological steps of an engineering solution available, if requirement specifications are complete. The example also presents a baseline for further refinement and expansion of analytical and laboratory techniques of terrain-vehicle systems evaluation, that was successfully used by General Motors-Boeing-NASA team and others in the development of the Lunar Roving Vehicle (Apollo 15, 16, and 17). The remarkable success of the methodology is seen, not only in the selection of a winning candidate vehicle, but also in the prediction of its most important aspects of performance on the moon with an error of 5 to 7 percent.

The illustration of the methodology emphasizes the three-fold developmental process of concept optimization: a user's requirement formulation, engineer's task solving, and user's selection (figure 1).

The simplistic example of the process, which for the sake of brevity and clarity omits a number of important evaluation functions—cost-reliability for instance—hopefully encompasses the samples of essential operations listed on the flow chart in figure 1.

The chart also emphasizes the following points that were presented in discussions:

- Ambiguity must be avoided in the formulation of user's requirements.
- The engineer's task solving ability lies within the scope of basically mature technology and engineering sciences.
- The user's final decision-making process and choice of the optimum vehicle candidate, is greatly penalized by underdeveloped definitions of mission and environment, and by the lack of mechanical properties data of the terrain and their statistical distribution.

The following illustration as to how the user's input and the designer's output should be formulated so as to enable both of them to make a rational choice of an optimum product, and to facilitate the user's decision-making, is based on the numerical example discussed below.

It is hoped that the simplicity of the numbers involved, serves to clarify the argument without destroying its generality.

User's Requirements: A Pattern

Following the outline of figure 1, the requirements are formulated starting with the mission definition:

Functional requirements specify the evaluation of potential vehicle candidates, wheeled and tracked, capable of towing loads with a drag of up to 4,480 pounds on horizontal planes. The tractor should fit an envelope of 6.5 x 3.5 x 3.5 feet. Cargo carrying capacity of 500 pounds for a cargo density of 35 pounds per cubic foot also should be provided.

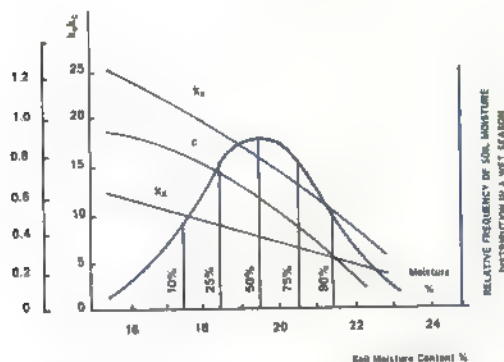


Figure 2. Soil values k_c , k_ϕ , and c (at $n=0.2$ and $\beta=38^\circ$) as a function of moisture content, expressed by the probability density curve of moisture distribution, during the wet season.

Operational requirements specify a hill climbing ability, without towed load, of up to 40 percent with an operating probability of 75 percent during the wet seasons of the year.

Environment definition. Soil moisture content was measured in the area of interest for 4 years, and the Gaussian distribution of moisture variation was as shown in figure 2. The figure also shows soil value parameters as a function of moisture content.

Soil value parameters k_c , k_ϕ , n , β are also shown as a function of moisture content. Maximum slope to be negotiated was specified as 40 percent.

User's Acceptance Criteria

Vehicle candidates, wheeled and tracked, are subject to the following criteria and weight factors which affect the final choice of vehicles:

Vehicles must satisfy all the mission requirements.

An envelope encroachment (in any dimension) of 20 percent will be tolerated if the probability of mission success is 20 percent higher than the probability of success of the nearest candidate that satisfies the envelope requirements.

Engineer's Task

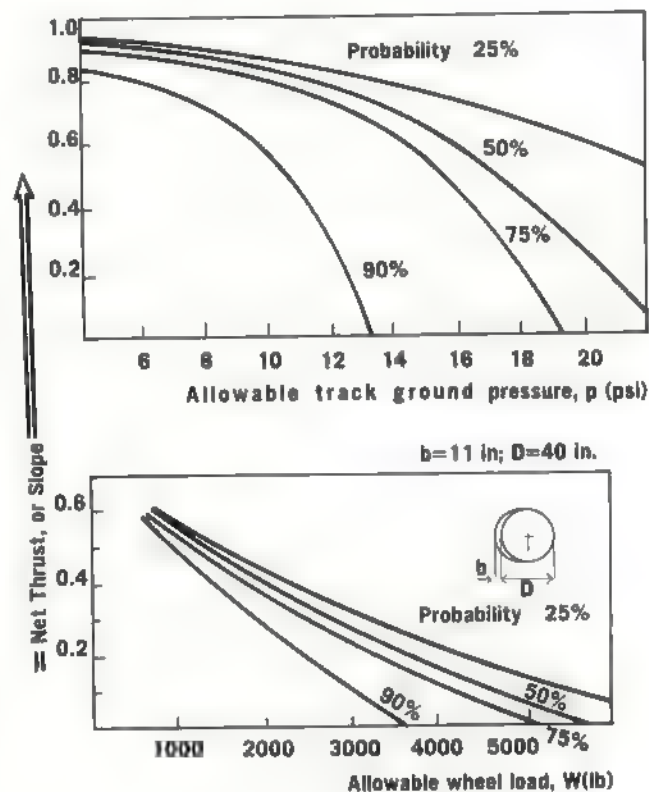
With the mission and environment specified along with acceptance criteria, the regular procedures of system analysis and parametric tradeoffs are followed.

Two basic equations bear on soil properties k_c , k_ϕ , c ; ground pressure P ; wheel load W ; wheel diameter D (high inflation pressure tire); wheel or track width b ; track ground contract length l ; and the net unit thrust of the running gear, t_{track} , t_{wheel} , which is the equivalent of the negotiable slope. For the sake of satisfying possible reader's interest, the general form of the equations in question is given below:

$$t_{\text{track}} = \frac{(c/p) - \tan \phi}{1.75 \left(\frac{W}{bD} \right)^{1/2} \left[\frac{1.15}{(k_c + k_\phi)} \right]^{1/2}}$$

$$t_{\text{wheel}} = \frac{[g/(2n) + 1]^{1/2} \left[\frac{1.15}{(k_c + k_\phi)} \right]^{1/2}}{1.75 \left(\frac{W}{bD} \right)^{1/2} \left[\frac{1.15}{(k_c + k_\phi)} \right]^{1/2}}$$

From the data bank of the state-of-the-art, $1/b$ was assumed as equal to $3P^{0.39}$, in track equation 1. Since the designer, however, has some freedom of choice, the value of $1/b=5$ was allowed, which needs a small correction in equation 1. Such an adjustment normally requires reiteration of computations; but, for the sake of time economy, this was not done because it did not jeopardize the conclusion of the argument. The accuracy of equations 1 and 2 was extensively tested with satisfactory results which were reported by this author in several engineering papers and in the author's book *Introduction to Terrain Vehicles*, published in 1969.



From this point, a purely computational procedure was started for feeding soil values into equations 1 and 2, for the probabilities of their encounter with, say 25, 50, 75, and 90 percent frequency of soil moisture distribution as shown in figure 2. This led to the establishment of t -values in terms of track-ground pressure P and wheel load W , as shown in figure 3. To this end, a number of D and b values were taken from the catalogue of pneumatic tires. As an illustration, values of $D=40$ inches and $b=11$ inches were reported on the graph in figure 3. Gross vehicle weight was assumed in accordance with the user's requirements:

$$GVW = 4480/C.4 = 11,200 \text{ lb}$$

And, the wheel load range was considered accordingly; within a 1,000-5,000 range to cover even a large number of small wheels (not reported here).

From figure 3, the following table can be assembled assuming $t = 0.4$ i.e., 40 percent of net thrust postulated by the user.

Gross Vehicle Weight: 11200 lb.

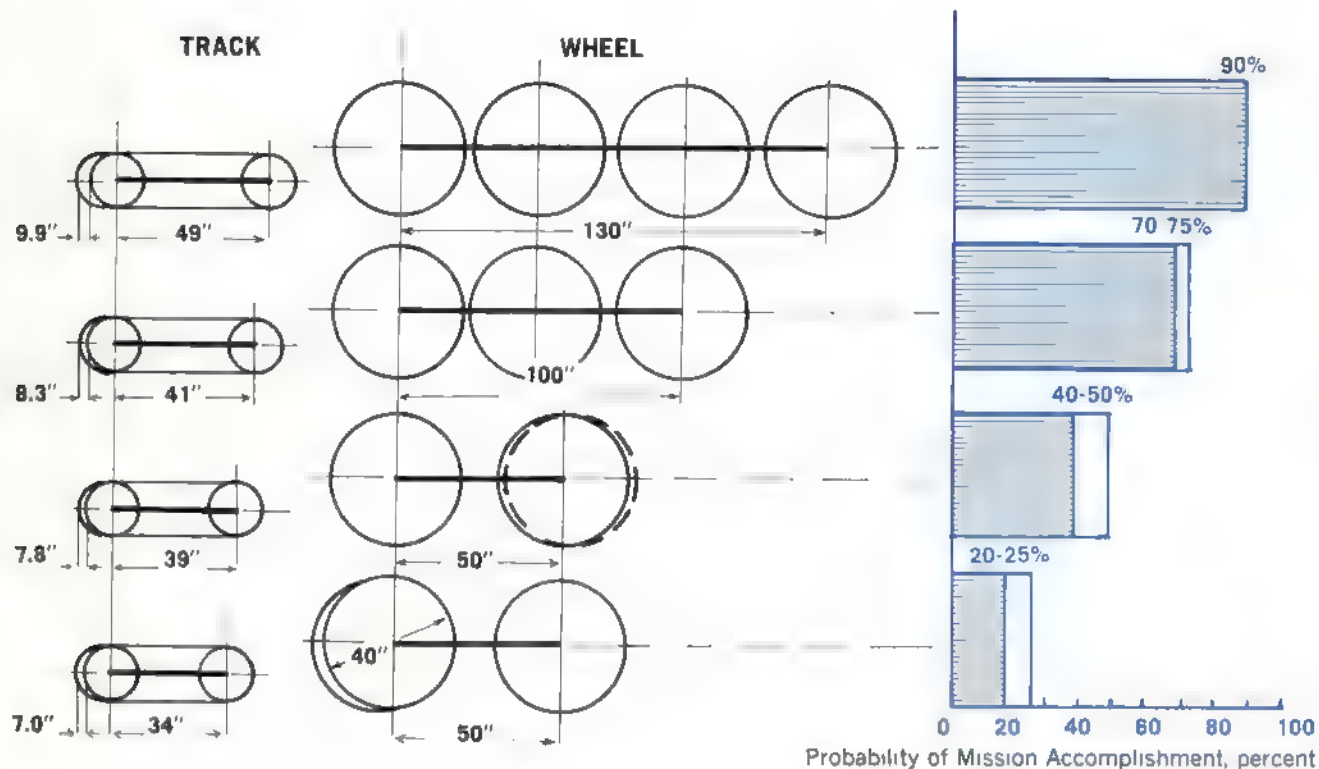


Figure 4. Dimensions of equivalent tracked and wheeled running gears which have the same soft ground and slope climbing performance

Table 1

Probability of Mission Accomplishment (%)	25	50	75	90
Needed Track Ground Pressure (psi)	23.5	18.3	16.3	11.5
Allowable Wheel Load W_w (lb)	2,400	2,000	1,800	1,400

Table 1 leads to the determination of track dimensions and the number of wheels required for the vehicle to accomplish its mission within the postulated probabilities:

Table 2
GVW = 11,200 lb

Probability of Mission Accomplishment (%)	25	50	75	90
Track Ground Contact Length (in)	34	39	41	49
Track Ground Contact Width (in)	7	7.8	8.3	9.9
Number of Wheels Required (rounded up to nearest integer)	4	5	6	8

The results are sketched in figure 4. Because of the rounding up of fractional wheel numbers, which have no physical meaning, the probabilities originally postulated were slightly changed as shown in figure 4. Now, the designer can select the winning candidates following users requirements.

From figure 4, it can be seen that only alternative II satisfies the mission requirement of 75 + 10 percent probability of success. Therefore, in accordance with the state-of-the-art, a baseline for both tracked and wheeled vehicles can be traced as shown in figure 5.

It is obvious that the wheeled vehicle, with tires with a diameter (D) of 40 inches and a width (b) of 11 inches, cannot fit the postulated envelope of 6.5 x 3.5 x 3.5 feet. But the tracked vehicle can. Then, in order to salvage the wheeled-vehicle concept, the tolerance clause of 20 percent envelope encroachment is tested. Unfortunately, the length of the needed 6 x 6 vehicle is surpassed by about 50 percent. Hence, it is rejected.

The semifinal choice is the tracked vehicle, alternate II, figure 4.

This simplistic analysis implies, that before the final choice is made, the user should demand engineering analyses of vehicles with wheels smaller and larger than 60 inches in diameter.

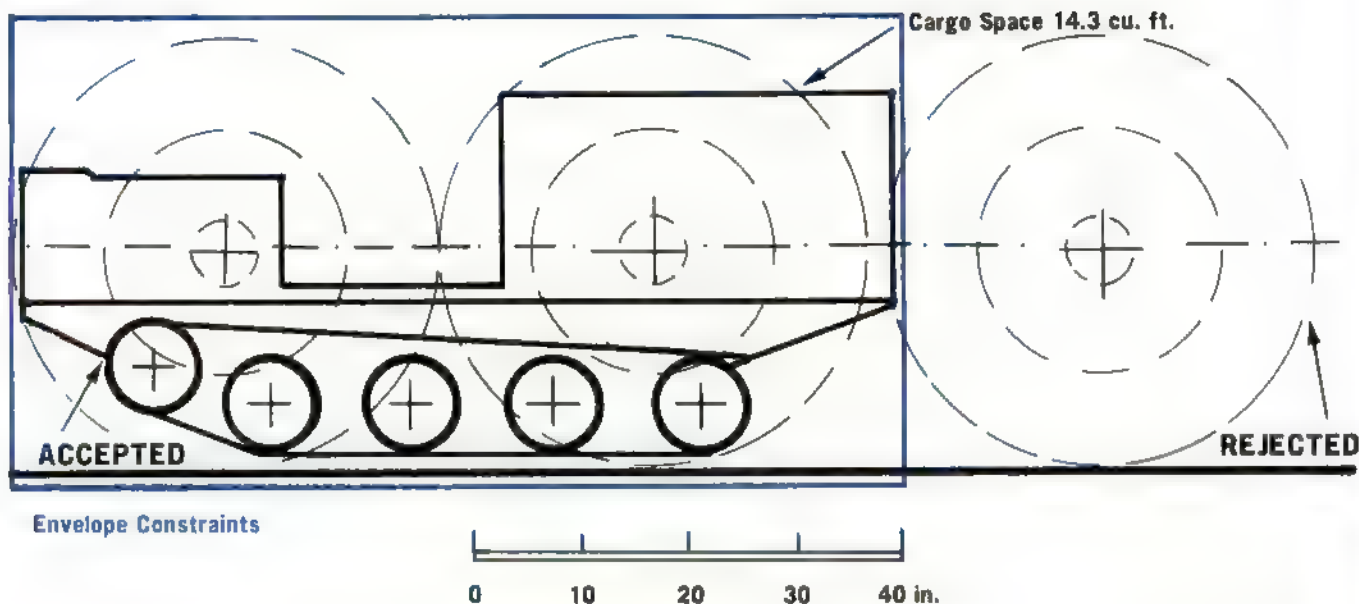


Figure 5. Baseline of equivalent tracked and wheeled vehicles which provide approx. 75% probability of mission accomplishment, in the postulated soft ground, with the required net thrust (slopes) of 0.4 GVW = 11,200 lb. Tire diameter 40 in, tire width 11 in.

A Verdict

The discussion of mobility problems referred to here, and the numerical illustration of the available solution to these problems, purport to emphasize the following:

- The state of engineering sciences and technology is mature and enables the engineer to rationally respond to the user's requirements.
- But the user's requirements, in their present form, are almost entirely insufficient for providing the engineer with the necessary information.
- An illustration of problem-solving, drawn from actual applied system analysis methodology, shows the character of the input data missing.
- Once complete input is provided by the user, the engineers can solve the problem and present the alternative solutions for the user.

Choice and Decision

These remarks throw light on the remedies for overcoming the present crisis in the development of new track and wheel vehicles

- It is not a technology crisis. It is the user's lack of appreciation of the modern-time requirement to provide proper field data on the environmental and operational processes.
- Technology can satisfy any mutually compatible requirements. (It is surprising how many RFP ask for the impossible due to conflicting requirements.) This necessitates lots of homework by the user when writing RFP
- The answer to user's future needs for new ground vehicles is not, in all probability, a radical departure from either the track or the wheel, but it is probably a track-wheel mobility system which helps to accomplish the mission within the postulated probability of success, with maximum effectiveness, and minimum cost of the equipment mix.

In conclusion, the so-called "basic" search for "methodology," and the endless pursuit of an idealized, all inclusive-type computer program is a myth. Reality lies in

the existing conventional, fully-tested parametric approach and system analyses. Naturally they ought to be improved and expanded, whenever required, in order to present the user with the most rational engineering alternatives. Then, he can make a choice. But, before we embark upon that kind of a vehicle of progress, the user must abandon unworkable definitions of mission—and environment, and provide a truly quantitative input, compatible with engineering sciences and modern technology.

Today, there is no room for arbitrary "indexes," particularly when their meaninglessness is adorned, if not covered, with complex omnibus-type computer programs which no one can follow and trust.

The methods of the 1940's cannot be the basis for development of new vehicles in the 1980's, even when computerized



DR. M.G. BEKKER, an engineer, scientist, and author holds two honorary doctorate degrees for his outstanding contribution to transportation engineering. A pioneer in the design of all terrain vehicles, Dr Bekker was a guiding force in development of the Lunar Rover Vehicle used during Apollo moon missions

Tankers Aweigh!

by Bill Herman

any of us have had a cross-branch experience we'd just as soon forget.

On my birthday in 1948, I came ashore at old "Charlie Pier" in Inchon for assignment and was assigned right there—on the spot—to the Port of Inchon. Nothing unique so far, except that I was a brash-and-brave member of the Armored Cavalry set (and logistics to me meant "if they won't issue it, steal it").

When the Port Commander (an Infantryman, I believe) said I was to become a "Basin Officer," I was about to blurt out, "What the hell is this—a hospital ship stop?" However, he cut me off with, "Since Inchon has a 31-foot tide, I'd like you to see what that means to ship operations. Report to the Tidal Basin—that's that square lake over there surrounded by ships and cargo."

"What do I do there?" I asked.

"Nothing. Just look—and try to look wise. I'll have our Transportation Corps officer fill you in later."

"But I'm not..."

"Forget your branch of service," he cut me off. "We have ONE trained TC officer here. If it'll help you any, this port is heavy in Infantry, Arty and AA (antiaircraft) people, and Warehouse 5 is in the loving care of an Air Force lieutenant. Now git."

So, first I learned about the Korean tide.

While walking around the dock area (wisely staying clear of the wildly swinging crates and slings), I was told that a Japanese ship's captain was signalling for me to join him for a beer, me being the new guy and all. Since I'd already heard tales of this native beer, I hastened aboard, over a plank set into a break in the ship's rail. After a quart or two and an hour or two, I went to the break in the rail, smartly saluted my captain-host and smartly fell 8 feet to the dock.

The tide in Inchon runs about 4 feet per hour.

The chipped anklebone was not nearly as painful as the dull innuendo from the other branch refugees in port. "How will you explain it to Fort Knox? — falling off a ship!" Another went, "Sergeant, take this ship out and shoot it—it just threw the Captain!"

But I also learned the Logistics picture. Inchon's mission was "backloading" to Yokohama, Kobe, and Okinawa, the mountains of cargo dumped on Korea—the end of the

pipeline. South of Seoul, many hillsides and whole bald hills were bedecked with vehicles, guns, 'dozers, cement plants, gravel-crushers, laundries, and packaged hospitals. Crates were almost solidly-daubed with stencils, some bearing shipping documents dated 1943 Oakland Army Base. And some had unique contents. One crate of "Automotive Spare Parts" yielded nothing more than Lucky Lager Beer, while a shipment of "Medical Supplies" contained a hundred pairs of hockey skates—transhipped from Saipan!

But the mission in the GI's simplified jargon was, "We backload this crap to Japan, then WE backload US outa here, too." Except for one thing. The cargo was still arriving, the supply hose still spewing!

While some ships were getting cargo out of the warehouses or off the hillsides, in another part of the Tidal Basin cargo was being craned from one ship (just arrived from Okinawa) to a ship alongside headed for Kobe. "Evacuation" from Korea appeared a hollow laugh because we knew there was more war cargo still on the way than there were Korean hills to hold it.

But, for the "Impressed Branches," it was a self-taught logistics course. We learned about ships, loading plans, stowage—and pilferage. "The ships" were U.S. 4,000-tonners with Japanese captains and crew. Somehow we solved our problems (perhaps as the Hollywood agent said: "Not sensationally, but sincerely"). Some of our decisions, it must be admitted, may have set ocean shipping back a decade or two. Like the "Good Ship Featherbed" entrusted (just once) to my care and loading.

It was a four-hatcher (holds) with cargo assigned me being some tons of DDT and paint for Kobe along with some cement mixers; many, many reefer (refrigerator)-trailers and "all the wet lumber you can take." I was in the middle of executing my loading plan when I was informed the ship would go to Okinawa first to drop off the lumber. So I bottomed-down the heavy equipment in the mid-hatches, planning to put the DDT in another hatch for Kobe as the plan 'unfolded' and thus level off the ship.

About the second day of loading came the call "Stop loading anything from the beach cargo—give the whole priority to the lieutenant in Warehouse 5—he's got orders to Tokyo!" The Air Force lad could "backload" himself to

Japan as soon as he emptied his warehouse—and he could find no more willing helpers.

"What's in your cargo dumps, lieutenant?" I asked.

"Oh, just some base hospital junk," he said.

"Well about how many tons? Operating Rooms and that stuff?"

"I don't think so—c'mon, lemme start sending it to you and we'll see."

He was so happily excited that I had to agree.

So we gave him the priority of the ship and the stuff came rolling in a steady convoy. I saw his cargo was mostly hospital beds, cabinets, chests, some ambulances, huge tents, so I adjusted my final-final loading scheme and put the DDT (Kobe) in the forehatch and kept the heavy stuff amidships (for Okinawa). Some heavy medical stuff in the stern hatch would balance the ship nicely, I was assured by "old seahands" (IG-JAG-MED).

As the mountains of steel beds and gear went into the ship, the Japanese officers on deck and bridge kept chattering at me, some coming down to prowl among the cargo piles on the docks. One day the skipper himself came down and solemnly pointed to the markings painted on the sides of his ship—Plimsol Lines, I hear they're called. He then inspected the numbers painted on the bow and stern of the ship. He tried to drum up a conversation with me, but our arm-and-hand language was too poor (and I had learned to spurn ship's beer by now). More important, the Air Force short-timer informed me that his warehouse was emptying; that he could, next morning, fill my stern hatch and top off my mid-ship hatches and the ship could sail away—and so could he.

The next morning I was detained at a court martial (not mine) and when I finally joined the ship to clear her for sailing, I found, instead, a new situation. All the ship's officers were on the dock ardently watching their bos'n as he repainted the Plimsol Lines in the Orient's most livid red. Their captain was *refusing to sail*. Why? The Air Force "warehouseman" had made his final deliveries that morning—all pillows!

Yes, he had, as promised, filled the stern hatch and topped off amidships.

But with the DDT up front, the ship was *14 feet down-by-the-head!*

Two bitter days passed while phones and radios crackled between Korea and Japan. But the captain would not sail until he was relieved of responsibility. In addition, he was running low on coal and Inchon could not coal him, so Japan was *ordering* him to sail and I was ordered to order him to sail. Then it was suggested he go to Kobe first for coal, but the Kobe cargo was in the *bottom* of the ship (and the captain flatly refused to entertain *any* re-stowing idea that would allow *me* to touch his ship again).

"What's the harm if he sails like that?" we asked the Transportation Corps officer. He clucked sagely and said "Not good." "But now he can see better over his hood," suggested a Signal Corps officer. "Bow! Lieutenant," said the TC. "Bow!" "Bow-Wow," the Signal answered.

"Look," said the TC, "his prop is out of the water—so's his rudder. Dangerous to steer and gets poor fuel rates."

Next the captain had a document prepared for my signature which I kindly refused (on advice of a JAG stevedore who assured me it was as good as a bill-of-sale for the ship if anything happened to it).



Several combinations of shifting water ballast from one tank to another got the "nose-list" down to only 13 feet low in the bow. The captain spent most of his time on the dock, staring at the Plimsol Lines of his ship. His emotions appeared to hover between fury and suicide. Then he had his boiler fires banked and he locked himself in his cabin.

A few days later he got some kind of relief of responsibility via radio, and made ready to sail, his ship's attitude in the water best described as a "crouch." With a crowd of thousands standing by, we opened the Inchon locks and he squished his way down the mud to the sea-channel, refusing to acknowledge any of the whistle and horn signals of other ships in the port.

Then he was gone, and I never got his name.

We learned later that the "*Good Ship Featherbed*" made Okinawa where the offer of the DDT in the forehatch was refused and only the *pillows* and heavy stuff taken out of the *stern* hatch. She got *some* coal (somewhere) and made it to Kobe, courtesy of some 140 tons of marble ballast blocks in her 'pillow-hatch.'

We have often wondered what the signal flags *read* on the ship as it left Inchon mudflats. But—there are a *few* things even a tanker doesn't know.



REINHOLD WILHELM (BILL) HERMAN records his Armor career thusly. "Have been a compulsive tanker since '41. One day they taught me to shoot from a moving tank. Then they taught me to teach other young thugs to shoot from moving tanks. Then we all went to Europe and shot from moving tanks. The next 30 years after that have been pretty damn dull."

THE MAKING OF A TANKER

by Captain Robert E. Laird

Laser rangefinders, solid state electronic computers, and stabilized gunsights and mounts are but a few of the sophisticated devices that today's armor crewman must be able to work with. The Army is constantly upgrading its training programs to better prepare the soldier for work with this equipment. New, efficient training methods and devices have been introduced to many programs—programs that have, in many cases, provided improved training at a cost savings.

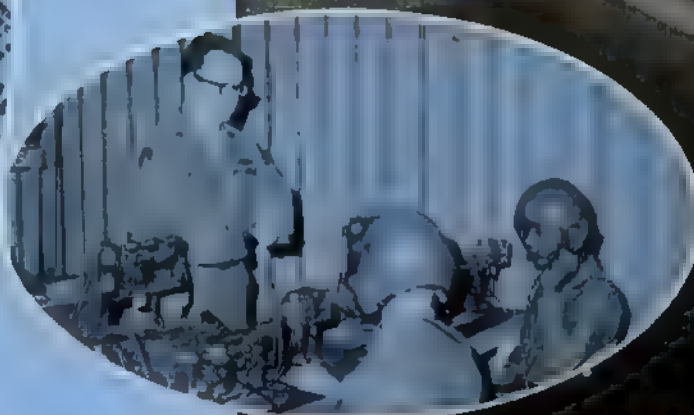
For the armor soldier, these new training concepts are embodied in the Holder Armored and Reconnaissance Facility at Fort Knox. Within the confines of this facility, the basic armor trainee acquires 75 percent of his MOS-related skills.

Known as the "Holder College of Armor Knowledge" by those who teach and train there, the training complex supports the diversified missions of the 1st Training Brigade-Armor (AIT). In terms of personnel, the facility supports an average daily training load of 1,700 students. Completed in 1972, the complex houses the latest in training aids and provides the armor crewman and cavalry scout with the best training environment possible.

In January of this year, the Brigade was one of the first training units to implement the One-Station-Unit-Training (OSUT) concept. Personnel now arrive directly from the reception station and in 13 weeks are molded into a tanker or cavalry scout. This new training concept will reduce the time necessary to train the new soldier, while maintaining or improving the quality of his training.

To align the brigade for its OSUT mission, seven basic combat training (BCT) companies and one BCT battalion headquarters were deactivated within the Training Center, and four additional companies/troops were activated in the 1st Brigade. There are now 10 companies devoted to the OSUT program of the 11E10 MOS and five troops devoted to the OSUT program of the 11D10 MOS. In addition to the OSUT battalions, there is a composite battalion in the Brigade. One company of the composite battalion conducts a 10-week Combat Engineer Vehicle Crewman AIT course on both the *Armored Vehicle Launched Bridge (AVLB)* and the *Combat Engineer Vehicle (CEV)*. The course satisfies the Army-wide requirement for the 12F10 MOS. Three other companies conduct two add-on three-week courses for the





M-60A2 tank (1 company) and *M-551 Sheridan* (2 companies). These programs take qualified graduates from the Armor/Reconnaissance programs and train them on these vehicles. A fifth company conducts advanced individual training for all armor crewmen of the Marine Corps and prior service Army personnel who are returning to active duty. A platoon of the 5th Cavalry Squadron provides the same type of training for the 11D10 program.

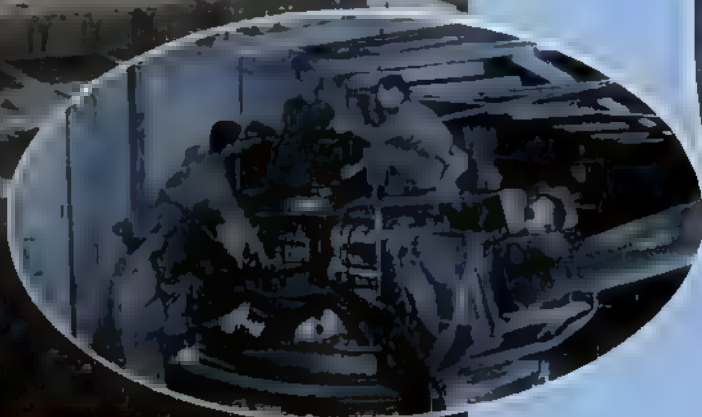
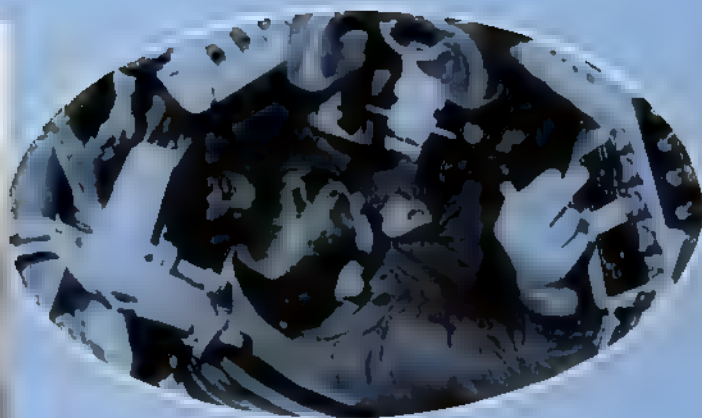
Not only does the Brigade train active Army personnel and members of the Marine Corps*, but also members of the Army Reserve and the Army National Guard. Most of the Reservists and Guardsmen return to units which have *M-48A1* and *M-48A2C* tanks. Consequently, following the normal 13-week program, these students receive a 16-hour familiarization course on the vehicles found in their units. The *M-48's* that are used for this training are located in the

* For the purpose of tank training, there are two Marine Corps platoons at Fort Knox at all times. These elements have Marine Corps drill sergeants who are graduates of the Noncommissioned Officer's Drill Sergeant School at Fort Knox. All of the Marines' training is totally integrated with that of their regular Army counterparts.

Headquarters and Service Company, and form the only known active Army *M-48A1* and *M-48A2C* platoon.

The training at Holder Complex is conducted in accordance with the latest U.S. Army doctrine. The Brigade POI Committee constantly updates lesson plans and training concepts to meet the needs of the commanders in the field. The POI Committee consists of one officer and 43 NCO's who conduct much of the classroom presentations and testing for the Brigade. They are also responsible for the maintenance of accurate lesson plans and training programs. The Brigade is constantly querying commanders in the field in order to maintain the highest standards of training.

Many training concepts have proven to be effective by constant revision over the years, but the one time-proven concept which has been a valuable asset in the training of tank crewmen remains unchanged—that is the utilization of a maximum student-to-tank commander ratio of three to one. This is the only effective way to train tankers. In the 1st Brigade, this ratio is achieved by organizing each company



into six platoons, only one of which is training on the tanks at any one time. The other platoons are receiving instruction from the drill sergeant (platoon leader) or a member of the POI Committee, or performing maintenance, guard, and detail. Each tank commander *always* has the same three trainees in each platoon on his tank. Thus, in the 13-week cycle, the tank commander can monitor the progress of each of his six "crews," and the student receives personalized instruction from the same tank commander throughout the cycle.

The overall mission of teaching the Armor soldier to move, shoot, and communicate is accomplished primarily *inside* Holder Complex. The complex incorporates four independent laser ranges, one driving and maintenance training building, one turret trainer building, and one building housing communications classrooms and general subjects classrooms. It also includes a Brigade Weapons Pool where individual and crew-served arms are stored.

With the most distant billets only 10 minutes away, the

driving range directly across the street, and the pistol range adjacent to the complex, the days of marching 20-40 minutes to a class site are over. The proximity of the training sites to the troop living area has eliminated an estimated 66.3 hours of "movement time" per trainee per cycle. In terms of an entire year's operation, this amounts to an additional 624,000 man-hours of training which may be conducted due to the closeness of the training facilities. Furthermore, when the movement of vehicles to outlying training sites is considered, the savings in time and money are substantial indeed.

A brief look at the Program-of-Instruction (POI) of OSUT will find the soldier being introduced to the tank using the *M-60A1* hulls during his second week in the Army. He progresses through the tank driver trainers to the driving range in the fifth week. Weeks 7 through 10 find the students on the burst-on-target (BOT) trainers and in the vehicle bays in preparation for the Preliminary Gunner's Examination and Tables I, II, and III of tank gunnery. By this

time, the future armor crewman is ready to announce ON THE WAY at one of the tank ranges at Fort Knox.

Quinn Hall contains the primary automotive and driver training devices. Located in this hall are 16 *M-34* driver trainers which are identical to the driver's compartment of the *M-60A1* tank. The *M-34* trainer is unique in that the tank commander can monitor the gauges of the driver's compartment by checking readings displayed on a console. The instructor can also use the console to induce typical malfunctions (electric fuel shut-off inoperative, engine out of fuel, battery overcharging, etc.) into the trainer so that the student can learn the correct procedures for coping with typical problems he may encounter when operating the actual vehicle.

The cost effectiveness of the *M-34* trainer is astounding. For a relatively low cost per trainer, a student can learn the fundamentals of tank driving without the high cost of fuel and the potential damage to the vehicle he may cause while learning. Through an audio monitor, the student can hear the vehicle engine and tracks just as he would in a real tank on the move. These training aids easily paid for themselves after 6 months of use.

Also located in Quinn Hall are five *M-60A1* tanks with the turrets removed which are used to facilitate instruction in the operation and maintenance of the automotive, track, and suspension system of the vehicle. These training aids can have faults applied to assist in training without the expense of disabling operational vehicles of the organization. Finally, there are 20 semi-enclosed tank bays where vehicles are parked for conducting tank gunnery training in an academic atmosphere.

All vehicles parked within the tank bays in the complex are fitted with a rectifier so that the building power may be used to operate the vehicle electrical systems. In addition to saving fuel and vehicle operation costs, the instructor does not have to compete with vehicular noises. And, since no diesel fumes are produced, additional classes can meet in rooms adjacent to the tank bays. As a side note, the Brigade has no problem keeping tank batteries charged because the batteries do not lose power while "plugged in" to the rectifiers.

The classroom building, known as Flint Hall, has four communications classrooms where Armor/Reconnaissance crewmen are instructed on the radio sets that they will most likely be using in their future units—the *AN-VRC-64* (102 each) and the *AN-VRC-46* (37 each). Each classroom seats 70 students. The armor apprentice receives 13 hours of training on communications prior to graduation (the scout receives 16 hours of training). The remainder of the hall consists of eight general subject classrooms where ammunition identification, map reading, conduct of fire, scouting techniques, and artillery adjustment are taught. Two classrooms are equipped with 16 burst-on-target (BOT) trainers which are used as the principal training device for teaching conduct of fire for armor crewmen. The BOT trainers, which have replaced less effective equipment, employ a 35-mm slide projector, a small laser beam, and a series of mirrors to teach BOT, as well as the secondary method of target engagement. After 18 months of use, this \$8,500 trainer has proven to be reliable and cost effective. In addition to being used for training, the BOT device is also

used for the conduct of fire portions of the Preliminary Gunner's Exam and End-of-Cycle Exam.

The Holder Complex is also equipped with four independent moving target ranges that are used in conjunction with the laser weapons simulator. These firing devices can be mounted in place of the coaxial machinegun on any vehicle or trainer equipped with the *M-219* machinegun. Three of the six firing tables required for graduation from armor crewman training are now fired with the laser weapons simulator inside Holder Complex. In comparison to the varied prices of service and sub-caliber ammunition, the laser's one-cent-per-light beam firing represents a considerable savings. The major savings in fuel and operating costs, though, is realized by training inside the complex rather than having to move to a distant firing range. The laser firing device is excellent for units having limited training facilities, such as National Guard and Reserve components, who can conduct their training with this device indoors.

Ifland Hall contains nine *M-60A2* turret trainers and nine *M-551 Sheridan* trainers. Virtually all of the turret training for the *M-551* and *M-60A2* add-on programs are conducted on these trainers.

The *Sheridan* trainer simulates the firing of the *Shillelagh* missile at virtually no cost and gives the student some idea of the recoil action of the 152-mm gun.

But no matter how realistic, expensive training aids, in order to be cost effective, must be kept in use as often as possible. The *Sheridan* turret trainer is in use 92.5 percent of the training week and the BOT trainers are in use 82.5 percent of the week. Only in a school-type atmosphere can this utilization of training devices be accomplished because units are tightly scheduled around their use.

In a nutshell, the armor crewman who graduates from the 1st Training Brigade is a licensed driver, qualified loader, and familiarized gunner. The reconnaissance scout and combat engineer vehicle crewman are trained to an equivalent level. The making of a tanker begins at Holder Complex. With its modern equipment, the trainee's time is efficiently consumed in training—not moving from one training site to another. By adding to the facility the knowledge of each vehicle commander, the 1st Training Brigade can continue to produce the quality and quantity of graduates which it does, cycle after cycle.



CPT ROBERT E. LAIRD was commissioned in Armor upon graduation from the United States Military Academy in 1970. He has served in Armor units in Europe and has commanded an Advanced Individual Training (AIT) unit at Fort Knox. Formerly the officer in charge of the Holder Complex, Captain Laird is now attending the Armor Officer Advanced Course.

Service Support for the Armored Cavalry Regiment



by George R. Albert

Over the past two years, there has been a lot of discussion concerning the combat service support needs of the ACR. Commanders have raised the issue and are suggesting that this support be organic. At the present time, except for aircraft maintenance, there are no direct support units organic to the ACR. Current doctrine and organizational structures provide for combat service support to the ACR by Corps Support Command (COSCOM) elements. From the Armor community standpoint, this becomes unrealistic based upon today's capability for rapid employment of the regiment, both to an overseas destination from CONUS and within the Corps zone. This highly mobile tactical fighting force, capable of sustaining combat power on a wide front can no longer be supported by non-organic units from bases far to the rear. The present missions of the Armored Cavalry Regiment include reconnaissance, surveillance, and security along with the ability to attack and defend as part of the main battle effort. This means that combat service support must be as dynamic as the combat power it supports.

The organization of the ACR today does not appear to provide for this equality. Not only are the missions more vigorous than ever before, but the increased distances in front of the main battle area make it more difficult for the ACR to receive responsive support. Therefore, experts feel that it's time for organic support units that are tailored to meet the needs of the armored cavalry regiment. Organic

units would provide the ACR with the capability to rapidly adapt its own combat service support requirements to its operational environment without delay.

Now the questions arise. What support should be organic to the ACR? What size organization is required? Where do the spaces come from? More importantly — is this organic support element as effective as the current system in terms of efficiency and economic use of manpower and material resources? These questions are admittedly not easy to answer. The answers start with identifying the critical functions that must be provided from organic resources. Those which most directly affect the combat mission of the regiment include:

- a. Supply — (primarily Class I, III and V) and
- b. Maintenance (including the supply of repair parts)

There are a number of alternate organizations which could provide this support to the regiment. A battalion-sized unit, including everything from supply and maintenance to general services could be designed; however, our current resources and our drive to gain most efficient use of logistics resources make this approach uneconomical. The battalion would cost about 700 spaces, many of which would be non-productive overhead, and would also be a cumbersome element for the ACR to control. In any event, some assistance is not required to be organic. For example, medical aid is best provided on an area basis without consideration to a tac-

tical boundary. A medical company is normally assigned to the Corps for each ACR; therefore, the regiment has dedicated, if not organic, medical support. In addition, the regiment uses medical facilities located within the divisions to its rear. The addition of a medical company to the ACR would not increase the efficiency of the regiment, nor improve the response time of medical support. Similarly, administrative support is provided from relatively secure areas well to the rear; therefore, these do not have to be organic to the regiment. The current area support type administrative company is ideally suited to provide support and to dispatch contact teams to the regiment when needed.

This leaves the needed organic support to tough, mobile, supply and maintenance elements capable of rapid response to the battle area. From forward locations, the organic elements repair or retrieve a combat vehicle, and establish ammunition and POL distribution points. To manage these requirements, a new element, possibly called the Regimental Support Center, would be established. This Center would include a Support Control Office and a unit of about 530 people containing supply, transportation, and maintenance functions. The Support Control Office would be the small command and control element of the Support Center. The complexity and critical nature of the Support Center could justify command by a field grade officer who would supervise the overall activities of the Support Center while the Center Support Section performs troop command and overhead support functions to include communications, food service, and unit supply and maintenance for the entire center. Figure 1 shows the breakout of the Support Center.

The Support Center supply and transportation elements

provide a combination of unit and supply point distribution for all classes of supply, less VIII, IX and X. Squadron S-4 and supply officers of separate companies would submit their requisitions to the support center for action. Low priority requisitions which cannot be filled are held until replenishment resupply is effected from COSCOM. Unfilled high priority requisitions are forwarded to COSCOM immediately. Requisitions for regulated or command controlled items are approved at command level before issue is made.

Class I resupply will not be difficult. The primary ration, in all probability, will consist of the meal combat, individual, backed up by the B ration whenever it is tactically sound to prepare that type food. Rations are relatively simple to forecast because they are based upon unit strength. The Class I section uses the strength reports or ration requests to prepare the regimental Class I requisitions. The ration breakdown point operates in or near the regimental trains area to provide supply point distribution to the squadrons. The extremely limited amount of perishable foodstuffs minimizes the need for refrigeration.

The Class III section operates distribution points from which the squadrons obtain POL resupply. It is proposed that 5,000-gallon tankers move to the vicinity of the squadron trains area. From that location, GOER type tankers can resupply the squadrons. These vehicles move out to individual locations and dispense the POL directly into portable POL bladders or the combat vehicles themselves.

A major area of concern to the ACR commander has been the resupply of ammunition. The location of the Corps Am-

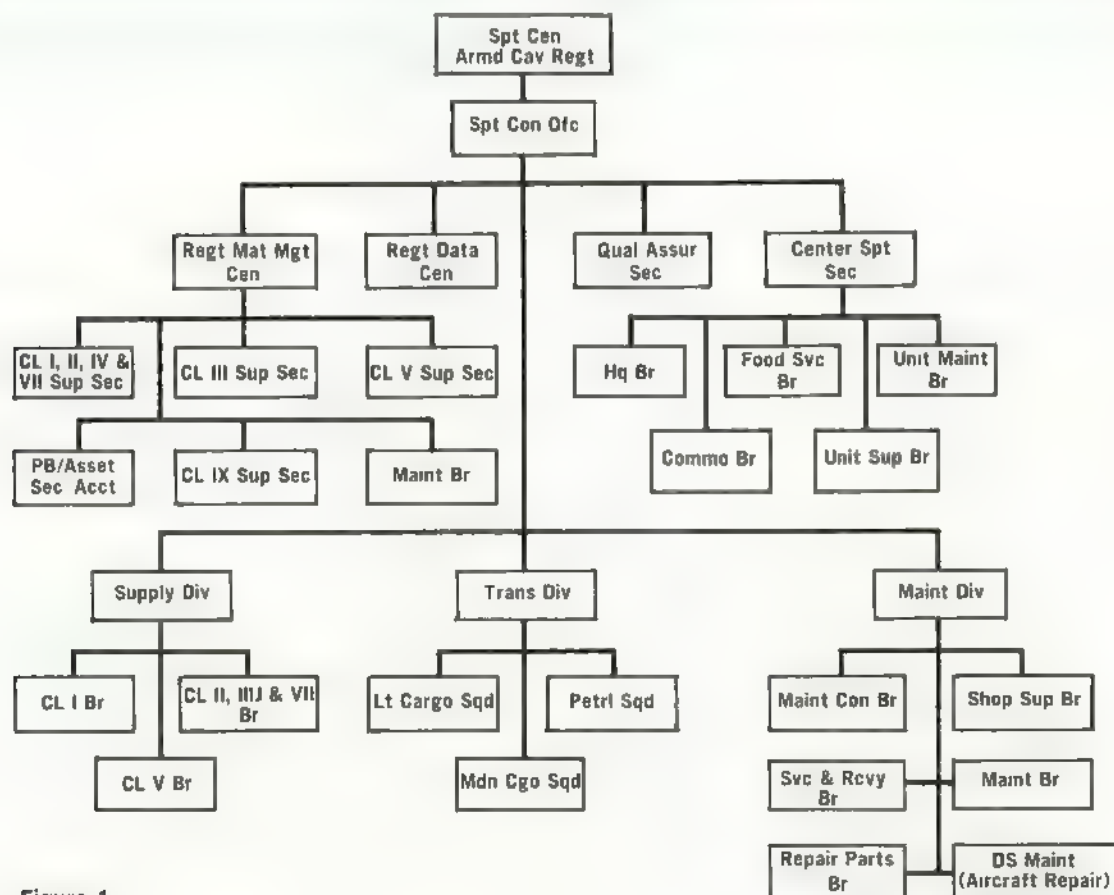


Figure 1



GOER type vehicles such as this could be used to transport ammunition from the Corps Ammunition Supply Point (ASP) forward to the ACR.

munition Supply Point (ASP) is frequently too far to the rear for the squadron ammunition trucks to reach. The increased distance in front of the main battle area that the regiment uses for an operational zone makes it imperative that ammunition be forwarded to the ACR for release to the squadrons. In order to reduce what is often excessive turn-around time, the ammunition section would operate a regimental ammunition point for basic load resupply. This is to be primarily a transfer point where critical ammunition, that has been throughput from a Corps ASP using COSCOM transportation, would be handled. At this location the ammunition section either retains the ammunition on a 12-ton stake and platform trailer or would stack it on the ground under temporary storage conditions. This decision would have to be based upon the current tactical situation, future planning guidance, and the availability of vehicles. From this location the section provides a combination of supply point and unit distribution. The howitzer batteries and the air cavalry troop will normally come to this point with their organic vehicles to resupply. Something entirely new for the ACR would be the combination unit and supply point distribution of ammunition to the squadrons. The ammunition section would move the ammunition to the squadron trains using the stake and platform vehicles from the transportation section. The lift capability may be provided by rough terrain forklifts. At the squadron trains, the ammunition is to be off-loaded to unit resupply vehicles which can go directly to the combat elements. This method can virtually eliminate the turn-around time of squadron resupply vehicles associated with supply point distribution, thereby increasing the responsiveness to the front line tank crews. When the squadrons are employed independently or the lateral distance is too great, the ammunition section could establish a distribution point in the vicinity of the squadron trains. The ammunition section must include sufficient personnel to operate the transfer points, two or three 4,000 pound rough terrain forklifts, and enough transport to move the section.

A large portion of this support center will be the maintenance elements. Their mission is to provide direct support maintenance to the regiment with emphasis placed upon repair of combat and mission essential equipment. The

maintenance elements operate from the regimental trains area and provide DS maintenance contact teams to the squadrons as required. These highly skilled teams operate within the squadron operational areas and include experts in cannibalization procedures, and personnel to diagnose maintenance problems on the battlefield to keep combat vehicles operational. The maintenance elements will provide control and issue of the maintenance float in accordance with guidance outlined by the regimental commander and assist in the recovery and evacuation of ACR material from the forward areas. The Class IX Supply Section will stock and issue repair parts for the regiment.

Where would the spaces come from to fill out this support center? They cannot be identified on a one-for-one basis, but it looks as if some of them are already in current COSCOM supply and maintenance units. Now it's a matter of identifying which spaces are in support of the ACR, pull them from the COSCOM and place them in the proposed organic support center. Spaces for the overhead will be the hardest to fill because they don't exist in the corps. Every attempt is being made to keep the command and control element at a manning level which will minimize the space requirements for that function.

There is danger that logistic assets could be dissipated to the point that no single unit would receive the benefit of support. Skills, such as missile repairman, turret mechanic, and instrument specialist are extremely hard to train and retain. Those in short supply are often more efficiently used in a central facility which provides the service on an area basis. This proposed unit will be thoroughly evaluated in order to identify voids and deficiencies in the plan. The final product should be an organization which can be supported logistically and, at the same time, provide the best coverage to the greatest number of customers.

As the tactical employment of the regiment changes — so must its support. The ACR has moved further and further away from its traditional Corps support base to the point where it becomes increasingly difficult to provide support. The regiment must not fail to meet its mission due to inadequate combat service support. The new organization proposed by the U.S. Army Logistics Center should be evaluated, modified, finalized and put into use. Only through a dynamic revision of our current policy for support can this important fighting machine sustain its power.

Dynamic logistics to support dynamic combat power—that's the goal!



GEORGE R. ALBERT, a former Armor officer who served with the 70th Tank Battalion during the Korean Conflict and the 14th Armored Cavalry Regiment from 1957-1960, is a graduate of the Armor Career Course, the Command and General Staff College and the Army Logistics Management Course. Mr. Albert is currently a Logistics Specialist with the United States Army Logistics Center, Fort Lee, Virginia.

The Gasoline Brigade

*From the book "Forging the Thunderbolt"**

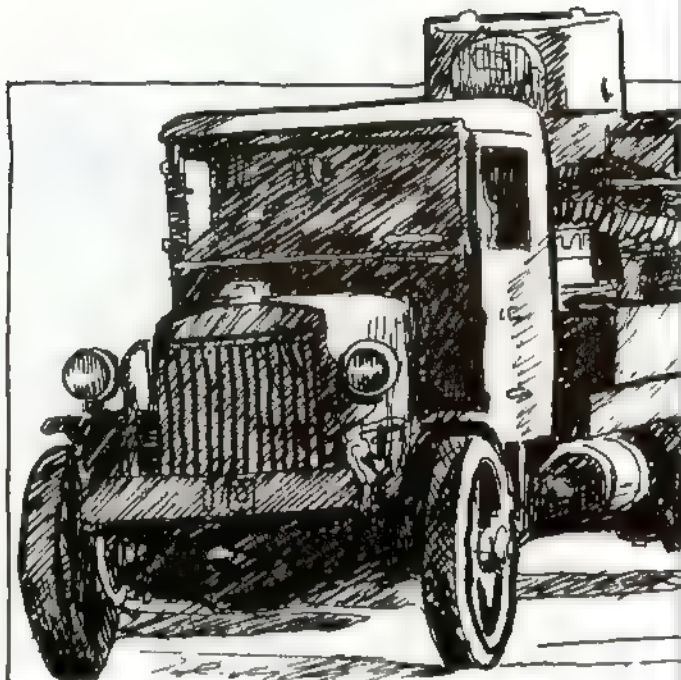
by Mildred Gillie

Ten years after the appearance of the first *Mark* tanks at the Somme, the British again made tank history. At the instigation of certain tank-minded officers who foresaw mechanized warfare in the future, an experimental force composed of tanks and armored cars had been organized, and in the summer of 1927, this unique outfit, the only one of its kind in the world, had been assembled at Aldershot, England, to demonstrate what it could do.

Present at one of the maneuvers was the U.S. Secretary of War, Dwight Davis, who was visiting in England. Though the Experimental Mechanized Force was less than 1 year old and a crude and makeshift affair, what Davis saw that day at Aldershot convinced him that the United States needed a similar organization. His orders to the Chief of Staff upon his return to this country, directing that such action be taken, forever altered the development of tanks in America. Proceeding through routine military channels, the Chief of Staff, General Charles P. Summerall, obeyed the instructions of the Secretary by dispatching to G-3 a little pink slip on which was written, "Organize a Mechanized Force. C.P.S."

It is doubtful if any more challenging task has ever been dumped into U.S. military laps during an interlude of peace, and the reaction of the officers of the various arms who constituted G-3 was mixed. Most of them were aware of tanks only as rather smelly, unmilitary monsters belonging to the infantry. Few had ever ridden in one, or desired to do so. And all they knew about a mechanized force had been gleaned from rather sparse accounts of the crazy English experiment in the service journals. Yet, if the chief wanted them to pull a mechanized force out of the hat for him, that they must do. Like good soliders, they set about the task.

Meantime, a soothing announcement was issued, which assured jittery brass hats of the infantry and cavalry that "motors and tanks would not displace (them)", as the conclusion had been reached that these branches of the Service must still continue to form the bulk of land forces in time of war. . . The first step in mechanization. . . will be the development of one completely mechanized unit for experimental

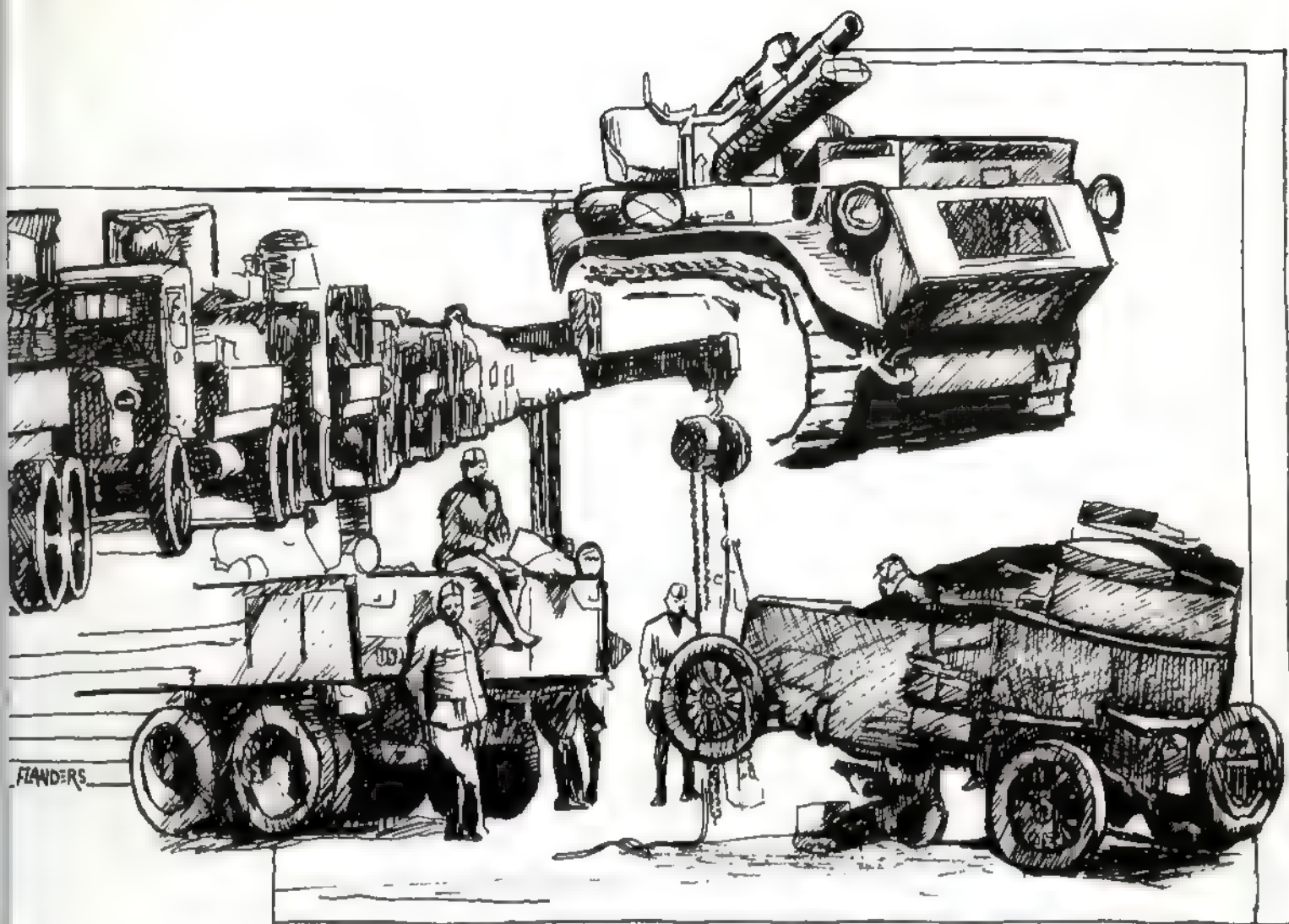


purposes, not as a part of the Infantry or Cavalry, but as a new arm. . ."

The fruition of 6 months of labor in the War Department was the assemblage of an Experimental Mechanized Force at Fort George G. Meade, Maryland on 1 July 1928. Though the press hailed Army's newest baby with a frenzy of enthusiasm, there was nothing to be excited about. What the papers saluted as "the pride of the Army" with "terrific smashing power" was in reality a pitifully weak and inadequate conglomeration of old, obsolete equipment.

From Fort Eustis, Virginia, there had come one battalion of the 34th Infantry, riding in World War Liberty trucks. From Fort Hoyle, Maryland had arrived the 2d Battalion, 6th Field Artillery, less one battery. They were equipped with French 75's, and porteed in Liberty trucks also. From other posts in the East, there had been borrowed a company of engineers, a signal company, a medical detachment, an ammunition train, and an observation squadron. Backbone of the force were the 16th Tank Battalion (light), equipped with *Renaults*, vintage World War I, the 17th Tank Battalion (heavy), equipped with *Mark VIII*'s, and the 2d Platoon, 4th Tank company, all from Meade, and contributed by the infantry. The cavalry had sent, albeit reluctantly, the one and only armored car troop in the country from Fort Myer. In all, there were some 3,000 men included in the original outfit.

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The performance of the "Gasoline Brigade," as it was fondly called by newsmen, was no more than could be expected from such an indifferently mechanized organization. The rattletrap trucks and aged tanks made 4 miles an hour if they were lucky, instead of a scheduled 10. What one writer impressively described as "an ominous rumble" too often was the asthmatic wheeze of a motor in its death agony. To complicate matters, Maryland highway officials put a crimp in maneuver plans by objecting to tanks marching on roads because they might ruin the taxpayers' asphalt. The ambitious objective laid down by the War Department to the commander of the mechanized force stated that he "by practical tests in tactical and strategical employments, will experiment with its organization and equipment with a view to developing correct doctrines with respect to motorization and mechanization of appropriate units of the Army." When, however, the old machines one after another broke down, the ambitious program had to be shelved, and on 20 September, with no money in sight to buy new equipment, "Uncle Sam's Mechanical Army" was hastily disbanded.

To proponents of a mechanized force, the debacle at Meade had not been heartening; yet it could not be considered entirely a failure. It augured well for the future of mechanization that branch jealousies had been submerged in a common effort without the compulsion of war. Moreover, the publicity attendant upon the event had

brought the subject of tanks into the spotlight and set the whole Army arguing pro and con. "To mechanize or not to mechanize" became the topic of the day. Impassioned brigadiers inveighed against the machine age and voiced their opinion that any continuation of the experiment would be a waste of time. "God invented man's hand and brain," they solemnly declared, "and no machine can ever take their place." More reasonable souls advocated another try, but next time with modern equipment, and found welcome vocal support in the *Washington Post*. "It has been proved," the paper said editorially, "that a motorized force is superior to one that is not. But a force mounted on broken-down equipment cannot prevail against an army mounted in modern, up-to-the-minute machines. It has been demonstrated that the need is imperative for increased appropriations for mechanization. Congress should not refuse any request for such funds."

To all impartial observers, however, it was clear that no tactical doctrines for a mechanized force had emerged from the mock battle of Maryland. "The impossibility of accepting or rejecting any ideas of mechanization based on the (George G. Meade) Force is recognized," stated the *Army-Navy Journal* on 21 July 1928. More study was deemed necessary by the War Department, and once again the matter of mechanization fell into the hands of G-3, where it was assigned to the Training Section.

Thus, to this small group was given the power to set the future course of mechanization in America. Would they agree with the men who had rejected the Meade experiment as folly, or would they blaze the trail for a new kind of army? Now, as never before, mechanization needed a champion.

"Father of the Armored Force"

"Military history has been made by the right man being at the right place at the right time," George Patton once remarked, and never was this more true than of the Armored Force and of his friend, Adna Romanza Chaffee.

At about the same time that Secretary Davis was watching the tank demonstration in England, this lean, hawk-eyed, high-goal polo-playing cavalry officer reported for duty on the War Department General Staff. There he was assigned to the Training Section of G-3. He was present when General Summerall's pink slip, directing the organization of a mechanized force, arrived, and was an interested participant in the lengthy discussions that ensued. Though he had never even ridden in a tank, he found that the more he learned about a mechanized force, the more his enthusiasm grew. He journeyed to Rochester, New York, to look at a new 7-ton tank, capable of going 18 miles an hour, that James Cunningham and Sons were building for the Ordnance Department. He witnessed at Meade the demonstration of another new experimental tank built by J. Walter Christie. This model weighed 10 tons and went 42-1/2 miles an hour.

"Should we tie tanks of these characteristics to the immediate front of infantry advancing at 2 miles per hour? Should they be hemmed in the restricted space between the barrage in front and the infantry in the rear?" he asked himself. To these questions, he believed the answer was "No."

"Can we use this light tank as the backbone itself of a force of given size? Can we view it, rather than the man on foot, as the principal arm in such a force?" He believed the answer to these was "Yes."

When, therefore, a restudy of the whole question of mechanization fell to the Training Section of which he was a member, he was already recognized in the War Department as a strong advocate of a mechanized force. Thirteen years later he wore the title, "Father of the Armored Force."

That Adna Chaffee became the leading exponent of *Blitzkrieg* warfare in America should have occasioned no surprise to those who knew him. No ordinary pace suited him. All his life he did things in a hurry.

On 23 September 1884, when he first presented himself to his pretty, golden-haired, young mother at Junction City, Kansas, he did not even wait for his Army father to return from the Indian Wars to attend his birth. As soon as he could sit on a horse, his father taught him to ride. Thenceforth, young Chaffee went charging over the plains at breakneck speeds, in imitation of his dashing parent. "He rode like an Indian," declared one of his friends.

At West Point, his dynamic energy found release in fearless and accomplished horsemanship in the riding hall and on the cavalry plain, and "he was considered one of the best riders, if not the best, in the class." It was at the Academy that he learned to play polo, a game which he continued to play for 30 years with considerable zest and distinction.

A fledgling lieutenant in the cavalry, he continued his studies in equitation at the Cavalry School in Fort Riley, Kansas, hard by the scene of his birth. In less than 3 years, he had acquired the reputation of being the "Army's finest horseman." No horseshow in Madison Square Garden or in Potomac Park was complete without this slim, handsome officer's name on the program; no polo game a success in which he did not star. Recognition of his talents came in 1911, when he was selected, the youngest in years and the lowest in rank of a team of five, to represent the United States in the International Horse Show held in London during the Coronation Week of George V. The following year he attended the French Cavalry School at Saumur, France, reputed to be the best in the world, where he acquired a foreign polish to his horsemanship by learning to jump over fully set dinner tables without so much as overturning a water glass.

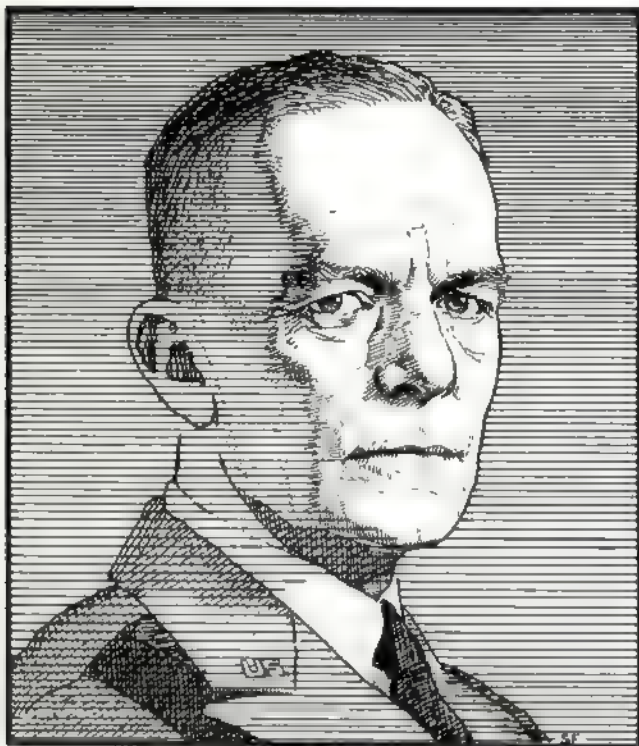
Had Chaffee been a man of just average intelligence, he might have been content with such horsey derringdo until he was old enough to retire. As it was, he possessed what magazine-writer Beverly Smith has described as "one of the best brains in the Army"—a brain that routine classroom exercises at West Point had not served to kindle. It was on the eve of our entry into the World War (I), when Chaffee was a captain and Senior Cavalry Instructor at the Academy, that suddenly he found the glitter of the riding ring and the triumphs of the polo field beginning to pall. He was then 33, married, and the father of one child. For many months, from his rocky, sheltered perch above the Hudson, he had been watching the panorama of world events and, on the map of Europe on the wall of his den, tracing the progress of the war with pins. One night he revealed to his wife the thoughts that filled his mind. "I am through with horseshow riding," he said. "There isn't any future in it. From now on it will be the serious side of the Army for me. I'm going to get on the General Staff."

When the war came, however, he went to Fort Jackson, South Carolina, as a major in the infantry. A few months later came his chance to go to the General Staff College of the A.E.F. at Langres, France. "At the school," reminisced one of his classmates, "all of us but Chaffee pored over our books all day and half the night. When we saw him finish his work at noon every day and leave, we were sure he would flunk."

Far from failing, Major Chaffee's grades in the course were so high that, much to his disgust, he was retained as an instructor. Thus forced to remain at Langres, he fretted and fumed with impatience, until a few months later, he was on his way to Pershing's headquarters, thence to the General Staff at the front.

As energetically as he had undertaken equine exploits in his early days, he now pursued his career on the General Staff. For his staff services during the war, he received the Distinguished Service Medal, which was pinned on his blouse by Pershing himself in Neuweid, Germany. Upon his return to the United States, he successively taught at the Command and General Staff School at Fort Leavenworth, Kansas and attended as a student the Army War College in Washington.

At the War College, he had come face to face with the problems incident to high command and to mobilization for



ADNA R CHAFFEE

war. Here, too, he had probed deeply into the industrial heart of America, from which flowed the tools of war. It was at this critical juncture of his career that the Chief of Cavalry, then General Malin Craig, sought to reclaim him for cavalry school service as head of the Horsemanship Department. Craig wanted a strong man to restore the school to its former position. He considered Chaffee the ideal man for the job. Despite strong urgings, however, Chaffee declined Craig's offer, demurring that there were younger men than he, and older men who had continued the riding end of cavalry, far better suited for the job.

The Armored Force: A Union of All Arms

Then came Summerall's directive to organize a mechanized force, and Chaffee's course was irrevocably set. The ideas for a future mechanized force, which emerged from the Training Section of G-3 after the Meade maneuvers, were his, and they formed the basis for a written report drawn up by a War Department Mechanization Board of which he was also a member. The last "i" was dotted and the last "t" of this document was crossed on 5 December 1928, and the same day Chaffee entrained with his wife for Florida to spend a month's leave in the sun. As they sped through the wintry Virginia hills, he said to his wife with a chuckle, "Well, today I turned in a paper at the War Department. When I come back, they'll either meet me with a brass band, or St. Elizabeth's funny wagon."

The paper was noteworthy in that it outlined for the first time for official consideration a definite program leading to the creation of an armored force. Specifically, it proposed a 4-year plan to organize as a part of the Regular Army a \$4

million, completely mechanized, self-contained, highly mobile regiment—this initial unit to serve as the testing laboratory for similar new fighting outfits which Chaffee predicted would form "a great part of the highly mobile combat troops of the next war." Likewise, it proposed that the new mechanized force be developed as a separate branch of the service, and that a general officer be appointed as its organizer and commander. The time set for the activation of the unit was the fiscal year 1931, beginning 1 July 1930. Nineteen hundred twenty nine was to be spent testing tank armor and antitank weapons.

Backbone of the force was to be fleets of fast, new tanks. But since tanks were "noisy, blind and their capacity for prolonged defense limited," auxiliary troops, mounted in armored cars, personnel carriers and trucks, would supply their deficiencies. Cannons mounted on tank chassis were proposed for mechanized artillery.

Equipment was to be furnished on the installment plan. Each year for the first 3 years, the mechanized force would receive one-third of its modern equipment, until by the end of the third year of its existence, it would be completely up-to-date—the idea behind this provision being to make the cost of the new organization an easier pill for the War Department budget to swallow.

Like the "Gasoline Brigade" the new force was to be a union of all the arms: cavalry in armored cars for reconnaissance, tanks to strike the enemy, infantry in trucks to hold the ground won by tanks until other infantry could arrive, artillery on tracks to give supporting fire, engineers to build and to clear, chemical warfare to supply fire, smoke and gas, antiaircraft to fight planes, signalmen to transmit orders, supply and repair to keep the vehicles moving—the whole to comprise a unit self-sufficient and self-supporting in combat.

The tactical role of the force would be based on its characteristics of speed, armor, and operating radius. Its missions would include seizure and temporary holding of distant key points, turning and enveloping movements where speed was essential, counterattacks, advance, flank or rear guard actions, and exploitation of a breakthrough.

"If fast tanks can operate in this manner," declared Chaffee, "we may greatly aid in restoring mobility to warfare, in keeping with the element of operating on the flank and rear and through the gap, in forcing the enemy to make detachments to guard his lines of communications, important bridges, airdromes and bases, and so considerably weaken his main forces in the battle. We may reach quicker decisions in war."

Tank Procurement Problems

Though the Secretary of War approved in principle the proposed program for a mechanized force, no provision was made in the forthcoming budget of the War Department to obtain money for its adoption. A number of reasons conspired to bring this about. Work on the budget which should have included the money had begun even before the maneuvers at Meade in the summer of 1928, and at the time of the completion of the mechanization report, the estimates for FY 1930 had already been prepared by the Budget Department and approved by the Secretary of War, and were ready for submission to Congress by the President. To insert

an item not included in the estimates required the sponsorship of a member of the Military Subcommittee of the House Appropriations Committee, a procedure which often entailed lively behind-the-scenes manipulation. It was first necessary to reach a congenial Congressional ear and then persuade it of the merits of the project for which the additional money was desired. If the Representative was convinced, then he consented to present the item before the committee members and plead for its adoption. A friend in Congress was quite literally often worth his weight in gold to War Department budgeteers.

The men who were powerful enough to have come to Chaffee's aid were made conspicuous by their failure to do so. Some were completely disinterested in the experiment, and expressed their attitude in bland indifference. Others jealously regarded the plan as an encroachment upon their domain and openly opposed it. Not a small group opined that the Army could ill afford such an expensive, new gadget as a mechanized force when the ranks of the military were so underpaid.

An undercover dogfight that developed between the Infantry and Ordnance on the question of tank models injected even more sulphur into the situation.

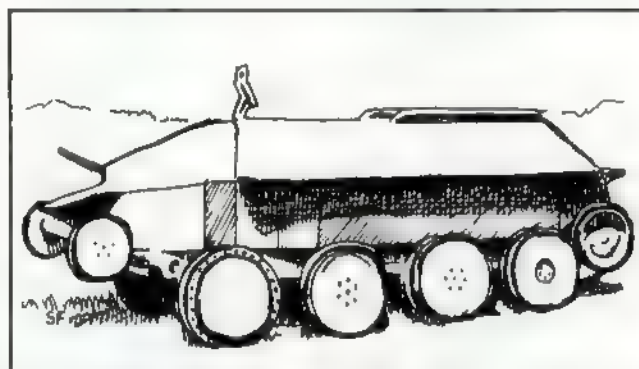
In 1927, the first light tank since World War I had been produced by Cunningham & Sons according to Ordnance specifications drawn up at the behest of Chief of Infantry Allen. This tank carried a crew of two, one 37-mm gun and one 30 cal. machinegun, and armor 0.25 to 0.375 inches thick. It weighed 7 1/2 tons and went 20 miles an hour, and it was called Light Tank, *T-1*. Though a drastic improvement over World War I U.S. tanks, its performance was still far from satisfactory. A second model light tank, *T1-E1*, was therefore built and finished in 1928, which proved to be no better—indeed, its speed had been cut down to 18 miles an hour. This was the tank Chaffee had viewed at Rochester.

Meanwhile, another light tank had been presented to the War Department for test by the forward-looking inventor, J. Walter Christie. In contrast to the 18 miles an hour of the Ordnance tank, Christie's vehicle went 42 1/2 miles an hour on tracks and 70 miles an hour on its wheels when the tracks were removed. Its armor was a half-inch thick; it weighed 8.6 tons without armament; and its performance across fields and over hills stole the show from its Ordnance competitor.

There resulted a sharp division in the official Army family on the question of which of the two tanks should be developed for use by both the Infantry and the proposed mechanized force. In the Budget Bill prepared in 1928, and passed by Congress in 1929, \$250 thousand had been appropriated for the manufacture of six to eight light *T1-E2* tanks for service test by the infantry. When, however, General Allen left the office of the Chief of Infantry in March, 1929, his successor, General Stephen O. Fuqua, urged a change in the budget provision to permit the purchase of five to six Christie tanks instead. The then Chief of Ordnance, Major General C. C. Williams, being agreeable, the matter was taken to the Congressional Committee of Appropriations, which gave its approval of the switch in tanks. Before the Christies could be ordered, however, Major General Samuel Hof became the new Chief of Ordnance. General Hof opposed the Christie tank on the ground that it had many engineering and mechanical flaws and, in a special conference with the Chief of Staff, pointed out that it would

weigh, when completely equipped, not the 7-1/2 to 8-ton limit for a U.S. light Army tank, but rather 15 tons. "That," he quoted Summerall as saying, "convinces me. I do not want a medium tank. I want a light tank." Claiming that one, not six, was sufficient to test whether the tank was any good, General Hof thereupon proceeded to spend \$62,000 for one Christie tank, and to allow the remainder of the \$250,000 to revert to the Treasury unused.

Congressmen inquired, not politely, why only one tank had been purchased when they had specifically authorized more. The upshot of an ensuing Congressional hearing, in



CHRISTIE'S PROPOSAL

which an imposing array of military men testified for and against the Christie tank, was that the \$250,000 was made available until 30 June 1932 solely for Christie tanks.

Caught in the maelstrom of such interbranch bickering, exponents of a mechanized force despaired of its accomplishment. An even greater blow to their hopes was the disbandment of Britain's Experimental Mechanized Force. The reason advanced for the move was that the equipment of the force was desired for experiment by the two older arms (Infantry and Cavalry), and that there was not equipment or money enough for both. If British pioneers were losing ground, what chance had an American force that did not even exist?

Although the War Department had not given him one cent of the \$4 million he had recommended for mechanization, Major Chaffee was far from discouraged. "Despite lost ground due to a setback in the matter of funds at present," he wrote to a friend, "I hope that the War Department will in some way be able to go ahead with the project. . . ." And in the year that followed, until October 1930, this idea was carried along almost solely by the enthusiasm and tireless efforts of this one man. All of his spare time was devoted to its study at home and abroad. His interest in mechanization developments in Britain was intense, and a fellow officer leaving for a post in England has written, "He (Chaffee) loaded me down with a terrible list of things he wanted to know from over there." To another friend, Chaffee wrote, "I have just prepared a memorandum which will result in the War College planning a mechanized war game based on the principles that are enunciated in the War Department studies on the subject."

In the budget bill for FY 1931, the proponents of a mechanized force were more successful. When the bill was signed by the President, it contained \$284,999 for mechanization, the money to become available 1 July 1930.

It was but a fraction of the money needed to organize and equip an adequate unit; but Chaffee believed that to wait for more funds would mean to delay so dangerously long that a mechanized force might never be started. A feud between two powerful governmental departments and a sympathetic Chief of Staff played into Chaffee's hands. In southeastern Virginia, on the tip of the peninsula between the York and James Rivers near the site of Cornwallis's surrender, was a small army post named Fort Eustis, which, for some time, the Army had considered evacuating and using merely as a place to store guns. When the Justice Department happened to get wind of these plans, they requested that the fort be used as a prison to quarter an overflow of Federal convicts instead. Reluctant to part with the Army post, Summerall settled the matter summarily with one stroke just before he departed the office of Chief of Staff. In October 1930, he issued his last directive. It read: "Assemble that mechanized force now. Station it at Fort Eustis. Make it permanent, not temporary."

An Armored Force Assembles

The conglomerate group of men and machines that began to straggle into the Virginia Army camp in the fall of 1930 was even less impressive than the original "Gasoline Brigade" that had lived briefly in Maryland 2 years before. But the new force was the more significant in that, according to the War Department directive, it was to be a permanent Army fixture.

There were finally assembled by the middle of November, 19 officers and 519 enlisted men, equipped with 66 trucks, 10 armored cars (one radio-equipped), 7 tractors, 22 passenger cars, 15 light tanks (4 *T-1*'s, 6 World War I *Renaults* re-engined with Franklin air-cooled engines to give them more speed, and 5 wartime *Renaults*, unmodernized), and 4 motorcycles. Such was the pitiful handful of vehicles that constituted the "armored might" of the greatest automotive country in the world.

The original outfit included:

- Troop A, 2d Armored Car Squadron. All the armored cars were fairly new, and they had originally been intended for the cavalry. Needless to say, that branch was not happy to lose them.

- Company A, 1st Light Tank Regiment. This unit had been transferred from Fort George G. Meade, and was part of the infantry's contribution to the force. "This company," remarked Chaffee, "is furnished, and I may say, burdened with, the best tank carriers that we have." (Tank carriers were tank-transporting trucks. The Christie tank, equipped with a removable track which converted the tank into a wheeled vehicle, was designed to eliminate the necessity for tank carriers.)

- Battery A, 6th Field Artillery. This group came from Fort Hoyle, Maryland, and was ported in old wartime Liberty trucks, which could not, "even then, keep their tactical place on the road."

- Company H, 34th Infantry. As the home station of the 34th was Fort Eustis, Company H merely transferred its allegiance. This company had been motorized, along with the rest of the 34th, on 1 August 1929, "the first time in the history of our Army a great unit of Infantry moved without

the aid of a single horse or mule." It was mounted in 1½-ton six-wheel trucks and was "a very serviceable organization for the purpose," said Chaffee.

- Company C, 13th Engineers. This was a motorized combat engineer outfit which came from Fort Humphreys, Virginia.

- A detachment of one officer and 15 men of the 1st Chemical Warfare Service was transferred from Edgewood Arsenal, Maryland. They were the proud possessors of one 4.2-inch chemical mortar on a self-propelled carriage, built in 1928.

- A platoon of the 69th Coast Artillery. Sent from Aberdeen Proving Ground in Maryland, these men were equipped to operate two automobile carriages carrying .50 cal. antiaircraft guns in single mounts and one automobile carriage with guns in double mount.

- The 19th Ordnance Company. This outfit was also from Aberdeen and was mounted in trucks "diverted temporarily for its use."

- A Quartermaster mobile repair shop from Fort Holabird, Maryland and a headquarters company, including a headquarters platoon, signal platoon, and supply platoon.

The commanding officer of the motley assemblage was an able, aggressive Cavalry officer, Colonel Daniel Van Voorhis. The mechanization report had recommended a general officer for the job, but few generals were interested in risking their careers in the novel undertaking and none could be spared. Van Voorhis had been carefully chosen from a long list of full colonels at a meeting in which the then Lieutenant Colonel Chaffee had played the deciding role. "Adna knew how important it was to get the right man," recalled Mrs. Chaffee, "and he went over that list again and again, eliminating names until he was sure Van Voorhis was the one." The qualities which led to this choice were Van Voorhis' incomparable organizational and administrative abilities.

Other names appearing on that list of first officers were: Major Sereno E. Brett, Executive Officer, former Infantry Tank School instructor, and for the preceding 2 years, commanding officer of the 2d Battalion, 1st Tank Regiment; Major Robert W. Grow, later the major general who commanded the 6th Armored Division of Patton's Third Army in its dash across France after the breakthrough at St. Lo in 1944; Captain David G. Barr and Captain A. R. Wilson, two men whose names appeared frequently in accounts of the early history of the force.

Meantime, in a public announcement, the Secretary of War made clear the purpose in creating the "newest unit of the Army." "Organized on the theory that modern tanks, on account of their armament, speed, marching radius and mechanical reliability are now capable of extended maneuvers beyond the immediate support of divisional infantry, the proper role of the Mechanized Force will be those tactical missions which present an opportunity for those characteristics. In the conduct of the training of this new Force, its mission will be that of a tactical laboratory for the determination of the proper tactics which can and must be used in the maneuver of fast tanks supported by other mechanized and motorized arms. In addition, it will test experimental equipment in the field. . ."

"The employment of this Force," he continued, "will in no way diminish the role of Infantry tanks." ■

A Less Vulnerable M-60 Turret

by Captain James D. Brown

Even the most informal consensus gathered from experienced tank crewmen reveals that receiving a main gun hit on the turret is a shoo-in for the list of "Ten Events Most Likely to Ruin One's Entire Day."

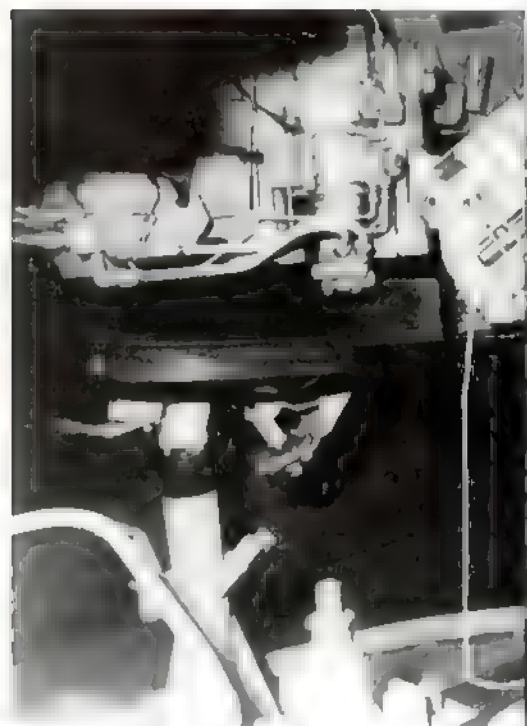
Recognition of the problem of turret vulnerability has been reinforced by analysis of combat losses on the desert battlefields of the Middle East. The turret of a typically configured main battle tank (MBT), crammed as it is with crew members, fire control equipment, weapons, and ammunition, offers a most lucrative aiming point for destruction of the tank. Even the safety of hull defilade, which protects the relatively vulnerable suspension and thin hull sides and stern, still exposes the turret to enemy direct fires.

Lessons learned from the Middle East have already been considered in the design philosophies of the *XM-1* and advanced versions of the *Leopard*. They have certainly been a factor in recently renewed interest in the Swedish *S-Tank*. Each of these tanks offers significantly improved protection of the fighting compartment.

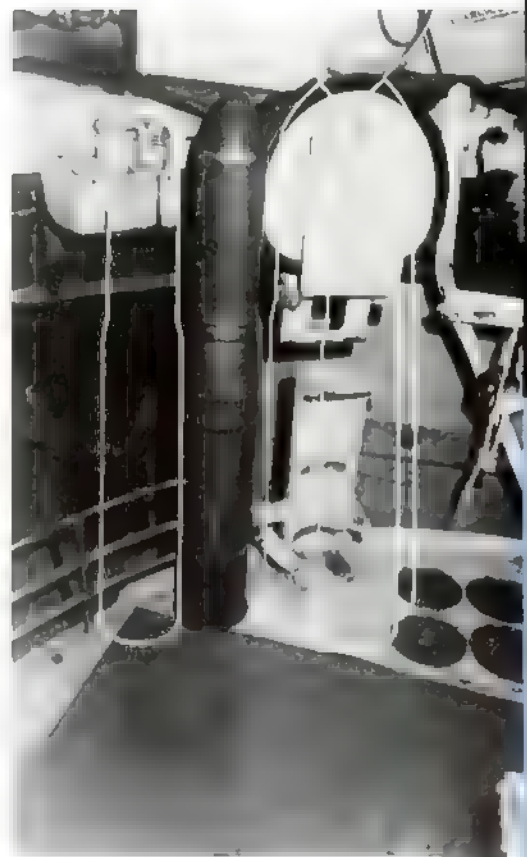
Interesting though these advanced designs may be, though, any analysis of turret vulnerability would be remiss if it failed to consider the continuing presence of older designs in present tank fleets. In particular, the first-line U.S. tank fleet will consist of a mix of *XM-1*'s and *M-60* variants (hereafter referred to as *M-60*) until well into the 1990's. Except for development of a fire-resistant fluid for the hydraulic fire control system, little work has been done to reduce vulnerability of the *M-60* for the 1990's threat.

If we are to maintain the *M-60* as a serious protagonist of the battlefield of the future, we must start planning now. At least four major programs suggest themselves for our examination. They are:

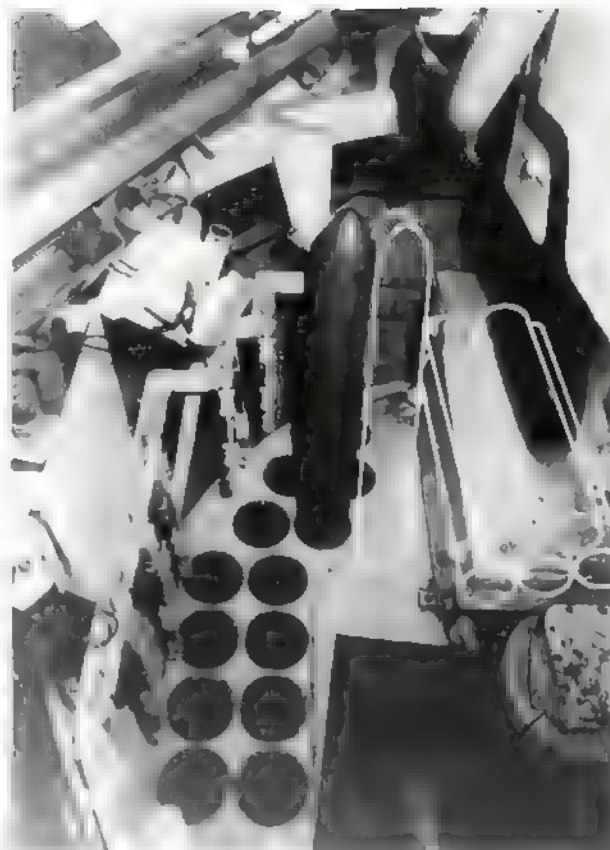
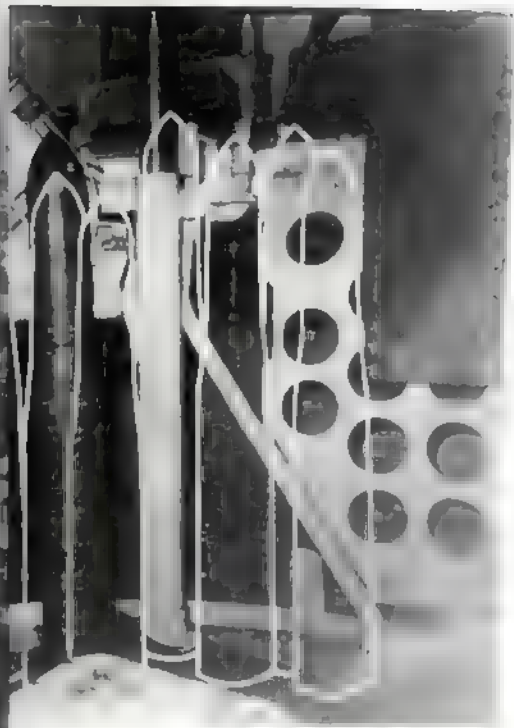
- Addition of applique armor to reduce the likelihood of penetrations of the turret.
- Removal of one or more crew members from the turret.
- Relocation of vulnerable items of weaponry and fire



TC's Station



Loader's Station



*Photographs were made
inside a turret trainer. Ed.*

Beneath Main Gun



Gunner's Station

control equipment to safer areas of the vehicle.

- Relocation of ammunition stored in the turret to less vulnerable locations.

Each of these programs seems desirable at first glance. However, practical restraints imposed by limited resources cause us to look more carefully before we leap into an unmanageable modification program. A reasonable set of planning criteria must limit our consideration to modifications which are:

- Inexpensive in terms of dollars and man-hours.
- Within the capability of present technology.
- Not likely to require trade-off of any present capability.

No great insight is needed to bring us to the conclusion that the first three proposed programs must be dismissed as requiring major expenditures of resources. Further, the second and third plans tax the limits of present technology and would hence require investment in an expensive research and development (R&D) program. The last program though, the proposal to relocate ammunition away from the turret, bears further investigation. It easily meets the first two planning criteria, and could, with some ingenuity on the part of the planner, be made to meet the third. Let us hypothetically attempt such a modification.

For purposes of our investigation, the tank chosen will be an *M-60A1* with add-on stabilization. While details of conversion of other variants may differ somewhat, the methodology will remain essentially constant.

Six areas of the turret will require our attention.

They are:

Turret Bustle. The 21-round ammunition rack will be removed. The rack can be easily disassembled with handtools and removed through the loader's hatch.

Under the Main Gun. The periscope storage boxes will be removed and relocated in the turret bustle. A rack for three to five rounds of ammunition will be substituted. In order to clear the stabilization circuitry, the rack must be oriented to allow access from the driver's station.

Floor Ready Rack. An additional two rounds will be stored leaning forward under the coaxial machinegun. Cradle-type racks from early *M-60* bustle storage will be used.

Loader's Station. A loader's seat mount will be welded high on the left turret wall. This higher mounting will afford the loader an observation station very similar to the one now enjoyed by the tank commander. The present seat assembly will be used without modification. The floor space formerly occupied by the loader's seat will accommodate an additional five rounds. Existing parts for the floor ready rack will be used to fabricate this rack.

Tank Commander's Station. The TC's seat assembly will be discarded, along with the commander's observation seat presently mounted on the turret ceiling above the radios. A vehicle commander's seat assembly from an *M-551* will be fixed between the turret ring and the ceiling. Its range of vertical adjustment is sufficient to accommodate the commander whether hatches are open or closed. Banana boxes will be discarded. Small arms ammunition will be stored in the expanded oddment tray above the new location of the periscope boxes. A sheet metal commander's platform will be fixed under the seat at or slightly above turret ring level. The space under this platform will accommodate an additional eight rounds in racks fabricated from existing ready rack parts.

Gunner's Station. Cradle-type racks will be installed to allow three to four rounds to be stored leaning forward beneath the computer. A final cradle stores a single round horizontally behind the gunner's seat.

A tabulation of these changes is made below:

MODIFICATION	CHANGE IN STORAGE CAPACITY
Turret Bustle	-21 rounds
Under Main Gun	+3 to +5 rounds
Floor Ready Rack	+2 rounds
Loader's Station	+5 rounds
Tank Commander's Station	+8 rounds
Gunner's Station	+4 to +5 rounds
NET CHANGE	+1 to +4 rounds

Reductions in turret vulnerability brought about by these modifications could be multiplied by the installation of polyethylene plates or ballistic blankets around the turret interior as protection against spalling and other effects of *HEAT* or *APDS* penetrations. It must be admitted however, that this would constitute significant departure from the use of off-the-shelf hardware and thus incur greatly increased program cost.

Review of our hypothetical modification program reveals that the three major design criteria can be met or exceeded. The hardware installations are all composed of parts already in the system. No major modifications are required; indeed the conversion could easily be fielded as a DS-level MWO kit. This field level installation is significant because it means that turrets could be modified without waiting for rebuild, which would drastically reduce the time needed to deploy this improvement to the field. Exotic technologies, with consequent development costs, are avoided. And lastly, no present capabilities need be traded off. Indeed, on-board ammunition storage can be increased and both the TC's and loader's stations can be improved.

In summary, the Reduced Vulnerability Turret envisioned here is a low-cost, low-risk means of quickly improving the *M-60* tanks in our present fleet. A single mock-up could be produced in a matter of weeks. Due to the simplicity of the recommended changes, troop testing and engineering studies could be completed in a correspondingly short time. Finally, stocks of needed parts are already available; a fact which can further reduce the time needed to begin the program. It only remains for us to start.



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If one believed what some people were saying not so long ago, tank technology was about to decline in importance to the level of the beating of sword blades.

Thus, only 3 years ago, the air was full of claims by guided-missile enthusiasts that the days of the tank were numbered. Their chorus included a major helicopter manufacturer who gleefully advertised in all sorts of publications the results of a contemporary U.S.-German trial in which 18 tanks were adjudged killed for each helicopter kill. Even *ARMOR* appeared to take seriously an article, by an Australian officer, with the sensational title "The Death of the Tank" (*ARMOR*, January-February, 1972).

Then in October 1973, when Egyptian infantry armed with Soviet-made *Sagger* antitank-guided missiles inflicted heavy losses on the first major Israeli armored unit to counterattack them, commentators all over the world started writing obituaries of the tank.

However, the initial success of anti-tank-guided missiles was not repeated

during the rest of the Arab-Israeli War. It became clear that tanks had not only survived but proved, once again, to be highly effective. In fact, the number of tanks destroyed by other tanks was several times that destroyed by missiles.

Lack of Understanding

In some quarters, the truth took time to sink in. Speaking for tanks at a defense-planning conference held 11 months after the Arab-Israeli War, I found myself heavily outnumbered by those who still believed that tanks were being made obsolete by guided missiles, albeit under the new label of "precision-guided munitions." Since then, however, more than one senior defense official has publicly reaffirmed his faith in the future of tanks.

The wild fluctuations of opinion about tanks are, nevertheless, regrettable because of the disturbing effect they tend to have on defense planning. They are all the more regrettable

Latest Trends In Tank Technology

Richard M. Ogorkiewicz

because they could have been avoided if the nature of tanks were better understood.

In particular, there has been a continued lack of understanding of the fact that tanks are, basically, a means of making the weapons mounted in them more effective by increasing their battlefield mobility. Tanks' ability to do this depends partly on their armor protection. However, their armor has never provided tanks with complete immunity, as some naive commentators seem to imagine. Nor is armor their only attribute. Tanks have not, therefore, been made obsolete by the appearance of various armor-piercing weapons which do not nullify the tanks' value as highly effective, mobile weapon platforms.

Guns or Missiles?

Traditionally, the principal weapons carried by tanks have been medium-caliber guns. Even before the advent of tanks, these guns had become the principal weapons of warfare in open country. With further development, medium caliber guns have enabled tanks to deal effectively with other tanks which have replaced men as the main battlefield targets.

During the past decade, however, the position of guns as the main armament of tanks has been challenged by guided-missile systems. In fact, some U.S. Army planners came to the conclusion as early as 1959 that future tanks should be armed with guided missiles. This led to the development of several tanks armed with 152-mm gun/*Shillelagh* missile launchers. But since the demise of the *MBT-70*, the U.S. Army has shown little interest in arming tanks with missile launchers. The French Army has also shelved further development of its 142-mm *ACRA* gun/launchers, which might have armed the second generation of *AMX-30* battle tanks.

The reason for the contemporary lack of interest in missile launchers as tank armament is that they have come to be considered inferior, overall, to guns, even though they might be superior to them in some respects. The principal advantage of guided-missile systems over guns are the higher hit probabilities which they offer at longer ranges.

On the other hand, only a fraction of tank engagements are likely to occur at long range, making performance at such ranges correspondingly less important.

Hit probability is not the ultimate basis on which to judge the effectiveness of alternative weapon systems. What is obviously required is not only to hit a target, but to kill it. Furthermore, the enemy tank needs to be killed in the shortest possible time, to reduce its chances of moving out of sight, and to minimize the exposure time of the tank which is firing.

This means that there are three increasingly more comprehensive measures of the effectiveness of the alternative weapon systems: *hit prob-*

"... on average, guns are superior to missiles in European and many other types of terrain."

ability, kill probability, and time to kill. When the most comprehensive of them, *time to kill*, is considered, guided missiles are still superior to guns at long ranges. On that same basis, guns stay superior to missiles to longer ranges than they do on the basis of hit probability. This fact, together with the way the frequency of acquiring targets varies with range, leads to the conclusion that *on average* guns are superior to missiles in European and many other types of terrain.

The shorter *time to kill* of guns at normal battle ranges is due largely to their higher rate of fire. Even manually-loaded 105-mm guns can be fired at the rate of eight rounds per minute and, given an automatic loader, they can be fired at the rate of 15 rounds per minute or more. In contrast, even supersonic-guided missiles, can only be fired at the rate of four rounds per minute, while other missile systems have a rate of fire of only three rounds per minute or less.

The importance of the rate of fire has

tended to be ignored because the relative effectiveness of guns and missiles has generally been assessed on the basis of single-shot hit probabilities. This is clearly unrealistic—a gun can fire two or three rounds in the time it takes to fire one missile. Moreover, a guided missile costs 20 times as much as a round of tank-gun ammunition; hence, a gun can fire several rounds for each missile without prejudicing its cost-effectiveness.

Gun-Ammunition Systems

The reassessment of the relative effectiveness of guns and guided missiles during the past 3 or 4 years has led to general agreement that the next generation of tanks should be armed with guns and not missile launchers. However, there is more than one gun-ammunition system that could be used.

The most successful so far have been conventional guns which fire armor-piercing discarding-sabot (APDS) rounds as their principal antitank ammunition. But, good as they are, the performance of these guns can be considerably improved.

One such improvement is the *XM-735* armor-piercing, fin-stabilized, discarding sabot 105-mm round that has been developed by the U.S. Army's Picatinny Arsenal. The fin stabilization of the *XM-735* round, which can be fired from rifled cannon, makes it possible to greatly increase the length to diameter ratio of the penetrator, thereby improving the armor defeating capability of the round as well as increasing its range. The exact increase in range has not been announced, but some Army officials describe it as being remarkable. The velocity of the new round has also been increased significantly over the 1,400 to 1,500 meters per second of existing *APDS* ammunition. Additionally, the fact that the round can be fired from existing rifled cannon instead of smoothbore guns gives the advantage of being able to continue to use high explosive rounds that are superior to fin-stabilized *HE* rounds fired from smoothbore tubes. All of this makes it possible to "upgrade" the punch of current tank inventories without designing and producing a new main gun.

One tank in service with a smoothbore gun firing *APFSDS* is the Soviet *T-62*. In the Arab-Israeli War, the performance of its 115-mm gun was generally considered inferior to that of the British-designed 105-mm gun, but it must be remembered that it has been in service now for more than 13 years. It does not, therefore, represent what could now be done with *APFSDS* projectiles.

Gun Fire-Control Systems

The advances in gun-ammunition systems during the past decade have been matched by developments in fire control systems which included the adoption of rangefinders and mechanical computers. But still greater improvements are now being achieved with laser rangefinders and electronic computers. In fact, the values of single-shot hit probability currently being achieved with the laser/computer combination are not far below the maximum possible values set by the random errors of the gun-ammunition system.

Still further progress might be expected in some directions: such as the

replacement of ruby lasers with neodymium-glass and meodymium-*YAG* lasers, which in time, are likely to be displaced by carbon-dioxide lasers that will be less affected by battlefield conditions. These lasers also should eliminate the danger of damage to human eyes which constrains the use of the existing lasers in training.

But, whatever progress is made with lasers and computers, the first-round hit probability of tank guns at longer ranges will remain less than 0.5. This means that, on the average, at least two rounds need to be fired to hit a target under many conditions. In consequence, to achieve a high-kill probability, it is necessary to fire bursts of two or more rounds.

Burst, Ripple, or Salvo Fire

The improvement in the probability of hitting targets at the halt, using bursts instead of single rounds is potentially greater than anything that might be expected from any further foreseeable developments in fire-control systems. The probability of scoring a hit does not, however, increase as

rapidly with the number of rounds fired as one might expect. This is particularly so when the single-shot hit probability is low, as it is when targets are engaged at long range. But if a round which missed could be sensed automatically and the information then obtained were used by the fire-control computer to correct the lay of the gun before another round was fired, the probability of scoring a hit would rise much more rapidly with the number of rounds fired.

Such ripple fire—instead of burst—with misdistance sensing would imply a closed-loop fire-control system similar to one being developed by the U.S. Navy for its *Phalanx* surface-to-air rapid-fire gun. It tracks the projectiles and feeds back the measured angular error into the fire-control computer, correcting the lay of the gun. In principle, a similar technique could be used with tank guns with the aid of a suitable video tracker.

A possible, if somewhat crude, alternative to firing bursts or ripples is to fire salvos of two or more rounds. This implies the mounting of a corresponding number of guns, resulting in



penalties of additional components and increased weight. Nevertheless, several vehicles have been built with multigun installations for firing salvos. A classic example is the six-gun *M-50 Ontos* antitank vehicle, used until a few years ago by the U.S. Marine Corps. The installation in a tank of a similar number of medium-caliber high-velocity guns is inconceivable, but two-gun tanks are feasible.

Fire on the Move

The development of fire-control systems with laser rangefinders and electronic computers has increased the probability of hitting both stationary and moving targets. The engagement of moving targets calls for additional sensors in the form of tachometers to provide the computer with information about the rate at which the targets are being tracked, in order that it may compute the appropriate lead angles. However, this does not involve any major extension of a fire-control system which already has an electronic computer.

To date, moving targets have been tracked optically under manual control, but in the future, this could be done automatically by an electro-optical system. The gunner would only have to lock on the target optically, and the target would be followed automatically by a gated video tracker. However, an automatic target-tracking system would only seem worthwhile for extensive firing on the move when the gunner has greater difficulty in tracking moving targets.

It is still a matter of controversy as to whether, or to what extent, tanks should be able to fire on the move. If they are to fire with any degree of accuracy while on the move, tanks obviously need stabilized gun controls. It is worth recalling that simple controls, which provided stabilization in elevation only, were fitted in U.S. tanks during World War II. They were not a success. But since the 50's, there has been a general revival of interest in stabilized gun controls, and they have been adopted in an increasing number of tanks.

From the *Centurion* onward, all control systems have attempted to stabilize tank guns in azimuth and elevation, and they have grown steadily more sophisticated. Thus, the two basic



gyroscopes mounted in the turret have been supplemented by additional gyroscopes mounted in the hull and by other motion sensors. This has greatly increased the ability of tank gunners to acquire targets on the move because their sights are slaved to the stabilized guns. In consequence, they can lay guns on the move so that a minimum of adjustment and time is required when tanks come to a short halt to fire. To achieve a high probability of hitting targets on the move, it seems necessary to adopt a somewhat different approach.

The alternative to direct stabilization of the main gun is a direct-type fire-control system with a directly stabilized gunner's sight to which the gun is slaved through computer-driver servos. The advantage of this approach is that the sight can be stabilized much more accurately because the mass involved is very small. Although the accuracy with which the gun can be stabilized remains inevitably lower, its hit probability can be increased significantly by inhibiting its fire until the instant when its bore coincides with the offset from the line of sight determined by the fire-control computer.

In principle, the director system can provide coincident firing in azimuth as well as elevation, enabling turretless tanks with semi-fixed guns that are stabilized in elevation, to fire on the move over a fairly wide frontal arc, provided they snake instead of following a straight course.

The case made for directly stabilized gunners' sights can be made for stabilizing the sights of commanders to enable them to acquire targets more

quickly. In fact, it can be argued that from the point of view of reducing the total time to kill under random battlefield conditions, stabilized commander's sights offer a more immediate return on money. It is not surprising that stabilized commanders' sights were installed in the *MBT-70*, *Leopard 2*, *M-60A2*, and the *S-Tank*.

There is, however, one major drawback to development of sophisticated fire- and gun-control systems—cost. In fact, if all the possible refinements were incorporated in any tank together with the latest night-vision equipment, the cost of it would probably amount to almost as much as the rest of the tank.

Armor and Battlefield Mobility

Whatever the precise form of the weapon system mounted in a tank, its battlefield effectiveness depends to a large extent on the tank's armor protection. This, obviously, governs its chances of survival if hit by an enemy weapon. What is perhaps less obvious is that armor protection also has a beneficial, as well as detrimental, effect on the system's mobility.

The effect of armor on mobility is detrimental because its weight makes the strategic transportability of tanks more difficult. In the extreme, weight can also adversely affect automotive performance of tanks, and in particular, their ability to move over soft ground. On the other hand, armor has a beneficial effect on the mobility of tanks because it allows them to move more freely under enemy fire.

Because of its adverse effect on auto-

motive performance and a lack of appreciation of its contribution to battlefield mobility, the value of armor protection has been frequently questioned in recent years. In particular, it has often been said that the armor of tanks can be perforated by relatively light infantry antitank weapons and consequently, that it was hardly worth having. On the face of it, such claims appeared true. Thus, because a shaped-charge warhead can penetrate steel armor to a depth equal to as much as six times its diameter, it has been pointed out that a small 100-mm diameter warhead can penetrate 600-mm of tank armor, which is sufficient to perforate the thickest plate of any tank.

However, the effectiveness of shaped-charge warheads is lower than such simple arguments make it appear. Moreover, new, more sophisticated forms of armor now offer greater protection.

Most information about new types of composite armor is still classified. However, details of one type released in Germany show it to consist of layers of steel, a ceramic material, and an aluminum alloy, making it about three times as effective against shaped charges as steel armor of the same weight. Tanks with this armor would be immune over their frontal arc to missiles with warheads of 100-mm or more without suffering a weight penalty. This armor's effectiveness makes infantry antitank guided missiles less of a threat than they are often claimed to be.

It is, of course, always possible to produce guided missiles with warheads large enough to perforate any type of armor. But, the battlefield mobility of larger missiles will be limited unless they are mounted in suitable armored vehicles—which would, in effect, be tanks¹

Engines and Transmissions

The contribution of armor protection to battlefield mobility of tanks may have often been overlooked, but much attention has always been given to the power of their engines and the power-to-weight ratio. However, the differences in the power-to-weight ratio of existing tanks do not appear to make a significant difference in the overall effectiveness of the tanks, regardless of the effect the different

power-to-weight ratios have on automotive performance. There is no evidence to suggest that the present tanks having the highest power-to-weight ratio of 21 h.p. per metric ton, such as the *Leopard 1* and the *AMX-30*, would have done any better in the Arab-Israeli War than the well-armored *Centurion*, with its 12 h.p. per ton.

Nevertheless, higher power-to-weight ratios are being demanded. In

"... 30 h.p. per metric ton was being demanded as long ago as the midfifties ..."

fact, 30 h.p. per metric ton was being demanded as long ago as the midfifties when the French and German general staffs were drawing up the specifications for a "European" tank, which led to the *Leopard* and the *AMX-30*. Neither tank made it, but 30 h.p. per metric ton has now been attained by the *MBT-70*, *Leopard 2*, and *XM-1*. Some would like to see even higher power-to-weight ratios, arguing that even higher power-to-weight ratios will enable tanks to dart more quickly from cover to cover and maneuver violently, thereby evading hits by hostile weapons. This approach to increasing the survivability of tanks through agility antedates the development of more effective, composite forms of armor, but its relative value remains to be proved.

Whether very high power-to-weight ratios are proved worth having or not, their actual attainment in tanks depends on the availability of suitable engines. The most powerful piston engines available are the Teledyne Continental *AVCR-1360*, used in the General Motors version of the *XM-1* and the *MTU-873*, which powers *Leopard 2*. Both were turbo-supercharged diesels originally developed for the *MBT-70*, and both develop 1,500 h.p. Such engines might seem more than adequate, but future

requirements are likely to call for engines developing 2,000 h.p., or even more for short periods of time.

The trend toward such high power favor gas turbines because of their high specific output, and Chrysler has adopted the Avco Lycoming *AGT 1500* gas turbine for their version of the *XM-1*. Nevertheless, the overall efficiency of gas turbines is still generally regarded to be inferior to that of diesels and the cost of turbines is higher. Almost all attention remains concentrated, therefore, on further development of reciprocating diesel engines. These are expected to have greater turbo-supercharging than ever before to increase their specific output, and various refinements will be incorporated to improve response.

If engine powers rise much above 1,500 h.p., there will also be a need for new transmissions. The highest capacity transmissions available at present are the Allison *X-1100*, used in the *XM-1*, and the Renk *HSWL-354*, which was originally developed for the *MBT-70* and is now used in *Leopard 2*. They are the most advanced embodiment of the prevailing trend in the development of tank transmissions and are similar in several respects. Both incorporate a hydrokinetic torque converter with a lock-up clutch, a four-speed automatically-controlled gear set, and a double-differential steering system with an infinitely variable hydrostatic steering drive.

However, there are transmissions which are even more advanced than the *X-1100* and *HSWL-354*. There are hydromechanical transmissions which have a hydrostatic pump and motor set for propulsion, as well as steering, arranged in parallel with gear trains in such a way that an increasing fraction of the engine power bypasses the hydrostatic set in higher gears. An experimental hydromechanical transmission produced by General Electric has been adopted for the *XM-723/MICV* and another experimental model capable of transmitting 1,500 h.p. has been developed by General Motors.

Suspensions

The ability of tanks to exploit high power-to-weight ratios in any but smooth or soft terrain depends to a large extent on their suspensions. On

smooth terrain, suspensions need to provide large road-wheel travel. This has been achieved in recent U.S. armored vehicles by replacing simple torsion bars with compound tube-over-bar springs. However, any attempt to meet an additional requirement for progressive springing with mechanical springs is bound to lead to considerable complications, strengthening the case for the alternative—hydropneumatic suspension units.

So far, hydropneumatic suspension units have suffered from the disadvantages of higher cost and complexity when compared with metallic springs and, apart from the *S-Tank*, their use has been confined to experimental vehicles. But, in addition to their progressive action, hydropneumatic suspension units offer the advantage of being readily installed outside the tank's hull. Hydropneumatic systems can also be interconnected to reduce pitching. As a consequence, their use in the next generation of tanks seems inevitable.

Hydropneumatic suspension units also lend themselves to automatic ride control—a feature which could significantly increase the cross-country speed of tanks. So far, however, no satisfactory means appears to have been found for sensing the terrain ahead of the vehicle. Therefore, a fully active suspension still remains to be built.

Configuration of Tanks

Having considered various components of subsystems, one is faced with the question of how they might be put together. What is the likely configuration of future tanks?

Any future tank design should try to meet one basic requirement—that of holding the internal volume of the vehicle to a minimum. The smaller the interior, the smaller the volume of its armor envelope. This either reduces the total weight of the tank, or makes it possible to provide it with greater armor protection within a given weight limit.

The most important factor concerning the volume of a tank is the space occupied by the crew. A striking illustration of this is the difference in the internal volume of typical Western tanks and cramped Soviet tanks, a difference that permits the Soviet tanks

to be 10 tons lighter without sacrificing protection.

A further reduction in the volume, and therefore, weight of tanks, could be made by departing from conventional, turreted layouts and adopting a turretless configuration which mounts a fixed gun. Such a tank could operate effectively with a crew of only two men. In this case, it could weigh not more than 25 tons and yet enjoy as much armor protection as any of today's tanks. Moreover, its layout would allow a complete separation of the ammunition from the crew and the rest of the vehicle, making it much less vulnerable to an explosion caused by its ammunition being hit. At the same time, its chances of being hit would be much reduced by its lower silhouette.

In spite of this, a turretless, two-man, fixed-gun tank seems unlikely to be accepted in the near future for various operational reasons. Nevertheless, many of its advantages could still be retained in a compromise design. This design could have a turretless configuration, with an externally-mounted limited-traverse gun, and be manned by a three-man crew. Alternatively, it could have some new, limited-traverse version of the low-frontal type turret on the *M-60A2* which incidentally, was spoiled almost completely by the illogical addition of a large cupola and other external additions. Either of these compromise designs should be able to retain several advantages of the turretless, fixed-gun tank, including a separated ammunition compartment. At the same time, compromised turretless designs could minimize some of the

shortcomings of the fixed-gun tank.

All of this accounts for the fact that, far from being in a decline, tank technology is a thriving area of activity. Whatever new models eventually emerge from the current studies and experiments, tanks are bound to remain an important item of military equipment. As such, they will remain a major element of any deterrent to conventional attack in all geographical areas where mechanized forces can operate and, as a result, a major instrument of political power.



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NIGHT TACTICAL EVALUATION

by Colonel John H. Weckerling

The Armor community has long been reticent to conduct night operations, and with justification. Problems inherent in day combat—target acquisition and engagement, command and control, and tactical movement, to name a few—are compounded at night. It is easy enough for a commander to issue an edict—"There is no difference between day and night tactics" or "Train to fight at night as well as day."—but it is harder to convince those of us nursing cuts and bruises in a tank bouncing cross-country at night! With *real* surprise targets—as opposed to the "G-2ed" gunnery range engagements of the past—even the most determined commander becomes frustrated when his tanks try, frequently and without success, to acquire surprise targets with the searchlight section or platoon while other elements attempt to engage.

Technological advances in passive night sight development promise fundamental changes in the nature of night combat, but *can Armor fight at night as in the day using these new night sights?* To answer this question, the Commandant of the U.S. Army Armor

School (USAARMS) directed that a night tactical evaluation exercise be conducted at Fort Knox, Kentucky, in April 1975.

The night vision devices evaluated were the latest (second generation) version of the passive image intensification (II) sights currently being tested on the *M-60A1E3* tank. Specifically, these were the driver's periscope, *AN/VVS-2*; the gunner's periscope, *M-35E1*; and the tank commander's caliber .50 machinegun periscope, *M-36E1*. Additionally, the tank commanders (TC's) were equipped with the *AN/PVS-5* passive night goggles. The platoon which conducted the *M-60A1E3* tank operational test (OT) II (from the 4th Battalion, 37th Armor, Lightning Brigade, USAARMS) was selected to conduct the evaluation. The current Army capability was represented by an *M-60A1* (AOS) tank platoon, also from the Lightning Brigade, equipped with standard IR sights. Since the passive night goggles are now a standard TOE item, these were issued to the TC's of the *M-60A1* tanks. Tactics described in DA Training Circulars 17-15-3, "Tank

Platoon Organization for Combat and Techniques of Movement," and 71-4-2, "The Tank/Mechanized Infantry Team," were the basis for the evaluation plan.

Briefly, the objective of the evaluation was to determine how effectively the two tank platoons could operate at night using current *day* tactics. The offensive exercises employed typical movement techniques—traveling, traveling overwatch, and bounding overwatch—followed by fire and maneuver upon enemy contact. Actions during hasty attack and assault were also evaluated. For each platoon, the enemy consisted of stationary personnel and vehicular targets closely approximating the Threat capability. These Threat targets "engaged" the platoons from surprise positions firing blank ammunition. Both "friendly" platoons were evaluated on their ability to acquire and engage these targets. To insure realistic target engagement, evaluators, also equipped with night sights to verify target kills and stopwatches to time the exercises, were on-board each tank. In effect, a modified REALTRAIN technique was employed during night exercises. Enemy vehicles were not camouflaged, but they were in hull-down positions. Enemy troops were exposed from the waist up, and were also uncamouflaged.

Defensive exercises were conducted in a similar manner, employing a realistic threat with a similar target array. Each test platoon occupied a night defensive position and attempted to acquire and engage tank and APC targets which were advancing toward their position. The enemy route of advance was designed to present fully exposed and hull-down stationary and moving targets to the defending platoons.

Ambient light was clearly going to be a key factor in the evaluation, so a photometer was set up in the maneuver area to measure illumination precisely in foot-candles. During the 3-week period of the evaluation, ambient light was generally good, ranging from 1 x 10⁻⁴ foot-candles (medium overcast, starlight up to quarter moon) to 5 x 10⁻² foot-candles (light haze, half to full moon).

How well did the two platoons do? It was determined that an Armor unit in defense, equipped with second generation passive night sights, can detect an attacking force without revealing its

own position by using active light devices. In this test, the *M-60A1E3* platoon passively acquired and engaged over half of the "enemy" tanks and APC's without any active light assistance at ranges in excess of a mile—a significant achievement. In contrast, the *M-60A1* platoon, using its one passive night sight on each tank, the TC's *AN/PVS-5* goggles, acquired less than one quarter of the targets and was able to engage targets only when they were illuminated by IR searchlights.

Results on the offense were equally impressive. First of all, the evaluation demonstrated that an Armor unit equipped with these sights can employ day offensive techniques of movement during night operations. On the rugged Fort Knox terrain, the typical night bound made by each platoon was between 400 and 700 meters. Visual contact was maintained between the over-watching and bounding sections, as the bounding section moved to the next terrain feature. Terrain features selected as overwatch positions at night were the same as those occupied during the day. Shorter bounds were not required. Moreover, tanks moved easily, using the terrain to gain hull-down, overwatch positions as well as covered routes to the next terrain features. It should be noted, however, that the rate of advance slowed when moving through wooded areas, where the ambient light level was low. Also, accurate depth perception of gullies and stream beds was difficult until the tanks approached the edge of these terrain features.

The superiority of the *M-60A1E3* platoon equipped with its complete night "suit" was most evident when the capability of the two platoons to engage surprise targets was compared. When the bounding section of the *M-60A1E3* platoon was fired on by the enemy, the overwatch section passively engaged, without any searchlight assistance, over two-thirds of the targets. In contrast, the *M-60A1* overwatch section engaged less than one-third, and required IR searchlight illumination to do it. Although the *M-60A1* TC's could acquire targets with their night goggles, the gunners, using their IR sights, could not engage until the searchlight tanks in the overwatch section illuminated the targets. On the first searchlight sweep, the illuminating elements sometimes swept past the

target. When this happened, they often were unable to find the target on the second sweep without another "cue", i.e., blank ammunition being fired by the enemy.

Before leaving the offense, a word or two on the assault. Distance traveled from the last covered and concealed position to the objective in this exercise was 900 meters. Both platoons moved buttoned-up, with the *E3* drivers employing the *AN/PVS-2* passive periscope and the *A1* drivers the *M-24* IR periscope. The TC's did their best to see through the cupola vision blocks with the passive goggles, but were never able to adjust the goggles to better than "hazy vision," to use the words of the tank commanders. The results of the exercises proved the efficiency of the driver's passive scope. During all assaults, the *E3* platoon moved to the objective quickly and in good order. In contrast, the *A1* platoon consistently became disoriented—one section crossed in front of the other on one run; during another, the sections were 300 meters apart when the objective was reached.

Obviously, the advantage a unit has when it can engage the enemy passively during darkness is enormous. The evaluation also proved how sensitive passive image intensifiers are to *any* light. For example, during one of the exercises, an observer, using a hand-held passive sight, detected a tank a mile away and informed the TC that his driver's escape hatch was missing. Why?—the tank interior red lights were on! Any active light, e.g., flashlights, "cat-eyes," tank interior lighting, regardless of color, or hatches closed or open, can be seen clearly using passive devices. Even flashlights pointed *away* from a passive sight can be detected at great ranges. Therefore, if the enemy is equipped with passive sights as we are, *total* light discipline must be enforced.

How about command and control? During the techniques of movement exercises, the evaluation sought to determine what visual signals, if any, could best be employed by the platoon leader to control movement. It was discovered that TC's, using the goggles, could observe specially designed, luminescent visual signals at close ranges, i.e., within the platoon when the traveling technique is used. Standard hand-and-arm and flag sig-

nals, however, could not be distinguished. Even static luminescent markers placed on the bustle of the tanks could not be observed at distances over 300 meters. Because of these limitations, it appears radio will be the primary means of control during night operations.

In summary, it can be unhesitatingly stated that an Armor unit, equipped with passive sights, possesses a greatly increased capability to engage in night combat. Given some ambient light, the second generation passive sights provide armor units with the capability to employ day tactics at night. In the offense, zones of attack can be assigned units as in the day instead of the directions of attack required by current doctrine. Objectives can be selected like those selected for day operations both in distance from the line of departure (LD) and in size. In the defense, units can acquire and engage an attacker without revealing friendly positions by using searchlights.

As technology progresses from image intensification to thermal devices, Armor's capability to fight at night will approximate day capabilities even more closely.



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LET'S HAVE A CAVALRY MOS!

Right now in any ground armored cavalry platoon, be it in CONUS, Korea, or Germany, in a divisional armored cavalry squadron or an armored cavalry regiment, you have four enlisted MOS's - 11B, 11C, 11D, and 11E. In the CONUS configuration, each MOS is in a different squad or section: 11B's in the rifle squad, 11C's in the support squad, 11D's in the scout section, and 11E's in the tank section.

Why not create a cavalry MOS—11D comes to mind as the most logical—found exclusively in cavalry units and make it the only MOS in the cavalry platoon? Consider the advantages of such a course of action.

First, the duties of the different MOS's in the cavalry platoon in many cases overlap. Many times you'll find an 11B from the infantry squad drafted as an observer in the scout section or as an assistant gunner in the mortar squad to cover a shortage of qualified personnel. Just as frequently you will find an 11D as the loader or driver on a *Sheridan* for annual *Sheridan* gunnery. I have had an E-6 11B, originally assigned as an infantry squad platoon sergeant due to a shortage of E-7's. The equipment the different sections work with is not that varied either. The mortar squads, infantry squads, and in some cases, the scout sections, all operate from the same basic vehicle, the *M-113A1*. In Germany, under the 3 for 5 organization, all 11D's operate from *Sheridans* just like those the 11E's in the tank section work on. A common MOS would much simplify the organization and personnel assignments within the platoon and allow troopers to work in different sections and cross-train without taking them outside their MOS.

A second advantage—we would not have the situation that now exists where soliders in cavalry units often have trouble maintaining overall MOS proficiency and do poorly on MOS tests because they never see, let alone work with, equipment or weapons common to other jobs in their MOS. Take the case of the 11E who goes through advanced individual training (AIT) at Fort Knox (with the *Sheridan* add-on training) and is then assigned to a cavalry unit or, even worse, the 11E who undergoes an 11E on-the-job (OJT) and AIT training program in a cavalry unit. Regardless of how proficient he is on all aspects of the *Sheridan*, he will undoubtedly do poorly on his MOS test because he will have received at the most minimal training and little exposure to the *M-60A1*, or *M-60A1E2*, the core weapons systems of the 11E MOS. The same can be said for the 11B or 11C, whose time in a cavalry unit is in many ways counterproductive due to the equipment, such as the 81-mm mortar, the 90-mm or 106-mm recoilless rifle, that he doesn't get a chance to work with. A cavalry MOS encompassing all sections within the

platoon would be broad enough to allow room for advancement and would encourage cross-training within the platoon to maintain proficiency in all aspects of the MOS. It would also eliminate the too prevalent attitude among 11B's and 11C's that they don't belong in a cavalry unit and are spinning their wheels there.

A third advantage ties into the one just discussed—the capability that a cavalry MOS gives to identify NCO's with cavalry experience and get them where their expertise can be used. How many 11B or 11C E-5, -6, or -7's are there in the Army who have had one tour with a cavalry unit, gained valuable experience, then never been out of an infantry battalion again? What are the chances of the 11B E-6 I mentioned above ever again being assigned to a cavalry unit? Certainly minimal. For that matter, how many 11E's are there around, with or without the R8 *Sheridan* additional skill indicator (ASI), who have spent 2 or 3 years out of 10 on a *Sheridan* and the rest of their time on *M-60's*? With a cavalry MOS, none of the valuable experience of our professional NCO's would be wasted.

The depth of experience a cavalry MOS would provide is another advantage. This is especially critical when you consider the many diverse and difficult missions of cavalry units. To retain control of a tank section, a scout section, or an armored cavalry platoon requires continuous training, especially of the subordinate leaders within the element. Can an NCO effectively control an armored cavalry platoon or a section within a platoon? Certainly much more easily if he has had the benefit of experience at the lower levels within the platoon, has been a scout driver, a *Sheridan* gunner, or a mortar gunner and fully understands how all the elements he's controlling accomplish their missions. The wealth of experience that a cavalry MOS would provide has the added advantage of giving a solid basis for training and assisting in maintaining proficiency.

Most important of all, a cavalry MOS would give back to cavalry units the sense of solidarity and esprit that now is sometimes lacking. Let's insure the fighting power of the units that will be the first to contact the enemy by making an assignment to a cavalry unit more than a detour from a career in line infantry or tank battalions. Let's have a cavalry MOS!

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The job of the aeroscout is dangerous — you learn, you survive.

And that's the purpose of this article—to help old aeroscouts learn more and grow older, and young aeroscouts to learn from the experience of those of us who have found ourselves in bad situations, with a handful of airplane, wondering what to do next.

Scouting is a job in which even the most calculated course of action is a choice of evils. But it is also rewarding by virtue of the fact that you are in a position to do great damage to the enemy; possibly even determine the outcome of a battle.

Scouting also carries with it great responsibility. Commanders, acting upon your information, may commit hundreds or thousands of troops. So the scout must always be aware of his obligation to his commander and, most of all, to his fellow warriors. The risk you take may save many lives. But I do not want to indicate that you take unnecessary risks. Many scouts come to their end because they are overaggressive. You take only those risks that enable you to accomplish your mission of obtaining information and reporting it accurately.

As for reporting, you don't see enemy squads, platoons, or companies. You see an exact number of troops or approximately so many troops. Don't blow up your reports with assumptions. If you believe that an area contains more enemy troops, or equipment, than you actually see, say why. Give the indicators—*truck tracks leading into the woods, rising smoke or recent heavy foot traffic on a trail.*

In looking ahead, who can say what kind of war we will be involved in next—or where it will be. In the sixties, we trained for one kind of war and were committed to one of a different type. In a rapidly changing world, we must keep an open mind and prepare for the future.

We must read about trouble spots in the world, paying particular attention to weather and terrain, analyzing the role both have played in campaigns of the past and estimating their effects on future battles. We want to know the average temperatures of an area as well as the highs and lows. We want to know about the lay of hills and mountains, their elevations, and the vegetation that covers them. Equally important to the aeroscout are the effects of seasonal changes. How will they affect the enemy? Will they affect our aircraft and our scouting techniques? These are but a few of the considerations we must make in preparing for future conflicts.

Now, let's discuss what, for all of us, will probably be the most difficult period of another conflict—those first few days or weeks after we are committed, a time when we are sort of green and unfamiliar with the situation. Wars have one thing in common. They are all different. So, all of us are greenhorns to a degree.

When we are committed to an area, we must develop a feel for the battlefield as soon as possible without getting killed. How? First, listen attentively to briefings on the terrain and enemy situation, and read map studies and intelligence reports of all types thoroughly. Second, have a look at the area firsthand and constantly add to your frame of reference.

But the best way to get the feel of the battlefield is to make contact with the enemy by making maximum use of fire sup-

HANGAR Talk for AEROSCOOTS

by CW2 Homer E. Shuman

port. Find out where he is and where he is not. Find out how he moves and what kind of weapons he has. Feel him out as you would a boxer. How hard can he hit? How can I avoid him? How long is his reach? What are his weaknesses? Can I take advantage of them? Can I set him up? In other words, don't try to be a hero—be a professional. Remember you have support available from artillery, naval gunfire, tac air strikes, and gunships—use it.

And *never, never* get so involved in a firefight that you forget your mission of collecting and reporting information to your commander.

So much for the preliminaries. Let's move on to day-to-day operations and have a look at the scout-gunship relationship. In Vietnam, the scout was almost always covered by gunships, and that was nice indeed. But the relationship must change. The key word now is *supporting*, not *covering*. We must plan to do all of our flying in the nap-of-the-earth (NOE) using the aircraft and weapons we have today because we will have to fight with what we have and do the best we can.

If the gunships are to survive, they must be moving or hidden. The scout-gunship teams will move by successive bounds, with the gunships following the scouts by one terrain feature at a distance of 1,000 to 3,000 meters.

The method of movement of the scout will vary, but he must follow the rule that requires him to fly slow enough to make a thorough visual search of the area to obtain the information needed for the mission. While reconnoitering over heavy vegetation, he may want to fly very slowly. On the other hand, when scouting in open terrain, he may want to use a binocular to observe a distant suspicious area.

Regardless of the method of movement you choose, avoid flying down the enemy's gun barrel. Come at suspected enemy positions from the flanks and rear. This method of searching an area will often put you in a position which gives you a line of observation that is at right angles to the line of fire of your supporting gunships. From such a position, the scout can use his agility and firepower to draw the enemy's attention while the gunship of the attacking team engages the target from a different direction. Another advantage of



this approach is that it enables the scout-gunship team to make the maximum use of surprise and firepower and permits the scout to observe until the enemy moves into the killing zone.

On enemy contact, you will want to develop the situation, but overflying the enemy position is not the best method for doing it if you intend to become an old scout. So, how do you do it? You engage him with fire. If your fire is accurate, you will get a response. Make note of how much and what type of fire you receive and the location from which it is coming. This technique is guaranteed to work when you cannot learn what you want from observation alone.

Receiving fire when you detect the enemy can really start the adrenalin flowing, but from my experience with small arms fire of .50 caliber on down, you can take an unbelievable amount of fire without being shot down. I don't have all of the answers for avoiding hits, but here are a few tips for making the enemy miss you.

- **Stay low.** This will render most radar controlled weapons useless against you.

- **When moving slowly, fly at 15 to 20 degrees out of trim.** If they lead your aircraft, you will not be moving in the direction you appear to be as seen from the ground.

- **Stay masked by terrain and by flying over wooded areas when possible.**

- **Ridgelines.** You will always be visible from one side or the other of the ridge. So you must present a fleeting target to prevent the enemy from delivering accurate fire on you while you are searching for him. Fly along the axis of the ridge, using S-turns or figure eights. The technique is to cross the ridge, dropping slightly below the ridgeline, then recross to the other side and repeat the procedure.

- **Sides of ridges.** The trick to mountain reconnaissance from a helicopter is to fly along the ridge as close to the terrain as possible—not an easy task for a beginner. At each turning point, reduce power slightly, turn away from the ridge, and drop down for the next sweep.

- **Valleys and draws.** Avoid flying up valleys or draws if possible, but, if you must do so, fly close to one ridge and

slightly below the ridgeline. If you take fire from the opposite ridge, add power, nose up, and turn over to the other side of the ridge that you are paralleling to mask yourself from the other ridge. If you take fire from the ridge that you are paralleling, turn away into the draw or valley to gain speed rapidly while seeking a masked position. The hazard to be avoided is that of being caught in the middle of the draw. With higher terrain on three sides, the only thing you can do is to make a slow turn while taking fire. Remember, you can't set at a stationary hover unless you are masked. If you are not masked, you must keep moving. Don't take chances. Be a professional.

We often hear the comment that the helicopter cannot survive on a high-intensity battlefield, particularly when weapons of the magnitude and potency of those to be found on a nuclear battlefield are considered. I believe that the helicopter can survive on any battlefield or in any environment where a tank, truck, personnel carrier, jeep, or ship can operate. The cavalry has always accomplished its mission of reconnaissance and security regardless of how it was mounted—whether on horses, jeeps, or tracked vehicles. The air cavalry will do the same.



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Structuring a Combat Maneuver Battalion

by Kenneth J. Ayers

From the time of the first tank, military men have attempted to develop a tank/infantry combat team. Their efforts have usually been unsuccessful for various mechanical reasons, but now, it is due primarily to a result of tradition and organization. The Arab-Israeli conflict of October 1973 provided the military with an opportunity to once again examine the use of armor, its tactics, equipment and organization. It has also rekindled the dialogue as to what constitutes a balanced combined-arms battalion.

In the July-August, 1975, issue of *ARMOR*, Captain Duncan F. Stewart presented a plan of organization which recommended the creation of a battalion consisting of two Hussar companies, which were primarily two pure armored platoons and one pure mechanized infantry platoon, and two Dragoon companies, which consisted primarily of two pure mechanized infantry platoons and one pure armor platoon. Captain Stewart apparently feels that this "Balanced Combined-Arms Battalion" would serve in place of the present arms battalions and mechanized infantry battalions.

There are five major problems in trying to combine individual companies or platoons of the armor battalions and mechanized infantry battalions:

- The officers and men are trained in their basic branch with emphasis placed on learning the basic skills of their branch.
- The complete exposure of all units in the combined-combat team to methods and procedures.
- Meeting the rigorous training schedules of their own battalion or company.
- The lack of complete understanding of the strong and weak points of the counterparts by the platoon, company and battalion commanders.
- The fact that combined-arms teams have always meant a marriage between the tank and the infantry with disregard to the artillery.

These problems, although great, could be overcome if the training of officers and men were geared to combat needs rather than traditional or present procedures, and provided we give up the age old concept of individual units in favor of a combined-combat team.

Using the battalion as the basic combat unit, its organization would be based on a headquarters company, combat support company and four armored companies (I have chosen to call the companies armored based on the Israeli practice of including all personnel in the Armored Branch as Armored, regardless of the individual's function).

The headquarters company would serve the battalion as the service support unit and as the command-control for the battalion. It would be made up primarily of the battalion's headquarters section, company headquarters section and maintenance section. Included in the headquarters company would be an expanded transportation-supply platoon, maintenance platoon, medical platoon and signal platoon. The headquarters company would have more personnel to accommodate large numbers of troops and vehicles.

The combat support company, as its name implies, is given the task of supporting the combat armored companies. This company would consist of the company headquarters section, maintenance section, radar section, combat engineer bridge section and five platoons. The first support platoon is the antiarmor platoon which would consist of 12 TOW missile systems mounted on armored vehicles with the same off-road capabilities as the main battle tank. The assignment of the second platoon is air defense. It would be made up of six anti-aircraft missile systems and four anti-aircraft automatic guns—all mounted on armored vehicles with the same off-road capabilities as the main battle tank in order to keep abreast of the advancing units and provide the battalion with an anti-aircraft umbrella. The third platoon is the armored recon platoon which acts as the eyes and ears of the battalion. It would be equipped with five armored recon vehicles, four armored recon tanks, one mechanized infantry combat vehicle with an 8-man scout squad, four motorcycles (one mounted on each scout vehicle) and a self-propelled 4.2-inch mortar to provide the platoon with its own high explosive firepower. All of the vehicles in the recon platoon would be armored, but more important, they should be capable of leaving the main body of the battalion, moving out ahead of the armored companies and gaining the needed information before the main battle tanks arrive at their location. Therefore, these vehicles must have greater speed and agility than the main battle tanks and sufficient firepower to protect their operations. In the fourth platoon, the old mortar platoon would be replaced by a howitzer battery consisting of six 105-mm howitzers, a fire direction control center, and six armored supply carriers. All of these vehicles would again be mounted on armored vehicles with the capabilities of the main battle tank. The supply carriers would be used to carry the howitzers' ammunition forward with the advance, thus providing sufficient ammunition for a sustained attack and defense of the battalion. The fifth platoon would be a heavy armored platoon (the term "heavy" does not indicate the weight of the vehicles, but the number of tanks concentrated within the platoon). There will always be a need for pure armored units to act as a reserve for the breakthrough follow-up, counterattacks, replacement for disabled tanks and security for the rear areas. Therefore, the fifth platoon of 12 main battle tanks (four 3-tank sections) would be the only pure armored unit under the battalion commander's control.

The main combat units of the battalion are the four armored companies. Each would consist of a company head-

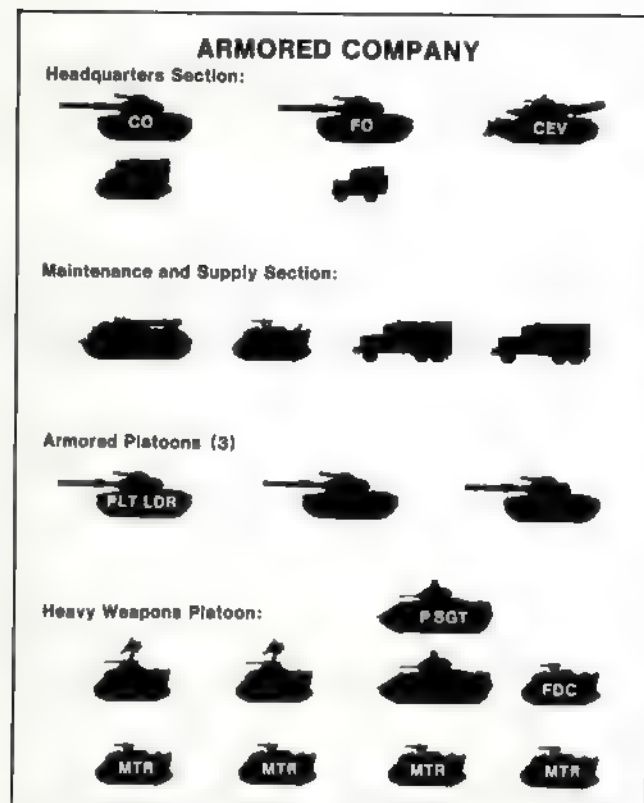


Figure 1

quarters section, maintenance section, three armored platoons and a heavy weapons platoon. The headquarters section would be made up of two main battle tanks (commander and forward observer), combat engineers' vehicle, armored command post and a ½-ton truck. The supply and maintenance section would consist of two 2½-ton trucks, one armored personnel carrier and an armored recovery vehicle. Each of the armor platoons would be composed of three main battle tanks and two mechanized infantry combat vehicles carrying two 8-man squads. These platoons would be the cutting edge of the armored sword, and, as such, would be the smallest tactical combat team. The infantry must be mounted in vehicles that would keep it abreast of the main battle tank on and off the road, and with sufficient protection to stop heavy machinegun fire, artillery fragments, and land mines. The three tanks provide the needed punch of the platoon, while the *MICV* supports the tanks against enemy infantry, infantry *ATGM* teams, mines, traps, etc. Therefore, the *MICV* should have a heavy machinegun and perhaps two medium machineguns mounted for heavy suppressive fire. (This tactic proved successful for the Israelis against the infantry *ATGM* teams.) It might also have a small cannon or an automatic fragmentation grenade launcher for support of the infantry and suppressive fire on *ATGM* teams and other *MICV*'s. The mortar platoon, which was normally found in the battalion support company, would now be integrated into the armor company to provide the artillery support within the company. The heavy weapons platoon would be made up of the former mortar platoon and an air-defense section. It would be equipped with an armored fire control center, four self-propelled armored 4.2-inch mortars and two armored anti-aircraft automatic guns. This platoon could be used to suppress exposed *ATGM* teams at ranges of 4,000 meters, as

well as support of the infantry against hard objectives. In addition to protecting the armored company from tactical aircraft, the anti-aircraft automatic guns could also be used as suppressive fire against light armored vehicles, *ATGM* teams and infantry.

The primary objective of the armored company is to conduct an offensive operation whose purpose is the destruction of the enemy, penetration into his rear units, cutting the lines of communication and destruction of his artillery and disruption of his command-control. The armored company can only achieve this objective if the equipment and organization provide the leader with the necessary immunity to both infantry and infantry *ATGM* of the enemy. Although the enemies' artillery is a major problem, this is left to the organic heavy weapons platoon, the combat support platoon of howitzers, and the division support artillery of 155-mm howitzers, 8-inch howitzers, 175-mm guns, rocket artillery, and the tactical air command.

The battalion commander has a great deal of flexibility with this organization in that he can choose between "two up and two back" or "three up and one back." The commander also has the heavy armored platoon to exploit the breakthrough, or to thwart an attack by throwing a heavy concentration of armor into the line. The increased artillery within the battalion gives the commander increased fire-power range and a great source of independence from division support or tactical air support.

The major advantage of this battalion is the 1,200 men, 60 tanks, 25 *MICV*'s with infantry, 17 heavy mortars and 6 medium artillery pieces. All of these units would be permanently attached to the armored battalion in order to integrate the training and orientation of the men.

The mechanized infantry battalions would need to be altered to incorporate a greater presence of armor and artillery support; however, their presence would still be necessary.

Within the last two years, *ARMOR* has presented three articles with possible solutions of the problem of the tank/infantry combat team. The only true test that can determine the validity of each of these proposals is combat. However, it would be hoped that within some near future a fair evaluation of each of these proposals would be tested by the U.S. Army before the only test available is the clash of armor.



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SUPPRESSION

Military planners have often been accused of preparing for the next war on the basis of their last combat experience. Although the U.S. Army was quick to shake the mantle of limited-war posture several years ago, the pace in adapting to the realities of modern conventional combat was accelerated by the Yom Kippur War experience.

We at the Field Artillery School are using the lessons learned from the Mideast War, the Scenario Oriented Recurring Evaluation System (SCORES) scenarios, and some plain down-to-earth thinking to define our future role on the modern battlefield. The many new tactics and techniques we are developing will make the Field Artillery System more responsive to the needs of maneuver than ever before. Perhaps the most significant of these new tactics and techniques are those providing for the support of leading maneuver elements moving to contact—those elements employing the "overwatch" technique.

The weapon which has done so much to change our thinking about the modern battlefield is the antitank guided missile (ATGM). Maneuver elements can now be taken under fire by ATGM's at ranges far greater than ever before. Since our current antitank and direct fire weapons are effective only to about 1,500-2,000 meters, these enemy weapons must be "pinned down" and their effectiveness degraded to allow lead maneuver forces to move against the enemy. That critical 1,500-meter gap between the maximum range of our weapons and the standoff range of the ATGM must be filled by artillery firepower.

Major changes in field artillery procedures will satisfy this requirement. Suppressive fires will often include smoke since the ATGM and the tank gun must see to shoot. We need to train much more on the use of smoke.

We intend to *dedicate* field artillery units to maneuver elements moving to contact. By this, we mean that a battery from the direct support artillery battalion can be dedicated on a one-on-one basis to a leading maneuver element—perhaps a company team—to answer immediate calls for suppressive fire. It will be the maneuver commander's choice as to which of his elements will receive this dedicated support. We visualize that a direct support battalion could provide up to two batteries in this dedicated role—keeping one free for quick response to other elements of the committed force.

A dedicated unit will *monitor* the command frequencies of the supported maneuver company for the express purpose of following the tactical situation and answering immediate calls for fire from a particular maneuver element. This will allow infantrymen and

tankers to call for fire in emergencies without changing frequencies. A thorough understanding of the situation and proper anticipation by the battery FDC will, in some instances, permit the guns to be laid on a target and loaded before the mission is sent.

Infantry and armor captains, lieutenants and platoon sergeants will be taught a simplified system for calling for and adjusting suppressive fires since we acknowledge that the artillery forward observer will not always be in a position to call for instant artillery fire throughout the company sector. Instructional material for this system will be furnished to the Infantry and Armor Schools where it will be taught in conjunction with their suppression programs.

We will short circuit our normal fire direction and firing battery procedures to get rounds from the dedicated battery in the air within 30-45 seconds for immediate suppressive fire missions. We will be ready to provide immediate suppressive fires for lead maneuver elements during those especially critical times when they are moving to contact.

We will ask maneuver units to use a standard system of checkpoints, phase lines, boundaries, and other control measures, and to furnish these to the dedicated battery for purposes of tracking their progress and identifying targets better. This will mean that company commanders and platoon leaders will not be adding checkpoints or phase lines after the command and control plan has been determined and furnished the artillery.

We will deviate from normal procedure in planning suppressive fires and will allow the forward observer to assign target numbers. These target numbers will be simplified to a letter and a number. Our lieutenants, as well as the maneuver officers, will be taught to use a thrust line method for quick fire planning. This method of hasty fire planning will provide relatively accurate target data directly to the FDC without the need for physically sending an overlay or encoding and decoding a series of targets.

Finally, if necessary, we will give up some degree of accuracy in the interest of speed for immediate suppression. When maneuver elements come under fire, our reaction must be quick and violent. Two 155-mm rounds impacting 200-300 meters from an enemy ATGM gunner will surely cause him some concern, whereas a battalion firing three volleys on target 5 minutes later might well be too late.

Because the enemy will normally open fire with his ATGM's at longer ranges—up to 3,000 meters when he can see that far—we can expect our initial artillery suppressive fires of HE and smoke to be well in front of our maneuver elements. This will ease some of the pressure for safety and clearances.

We recognize that we are putting a great deal of responsibility on our field artillery units which will be

engaged in the support of movement to contact operations. The battery commander especially will be under pressure. He will need to be in the FDC when his supported maneuver force is moving to contact. But the fact remains that the movement to contact on the modern battlefield is so crucial to the success of our forces that the suppressive fires I have discussed must be available.

We know that we can provide this support only if we train for it, and train hard. Suppressive fire requires a great deal of coordination between maneuver and fire support—and that automatic procedures within the supporting field artillery battery be executed without flaw.

The Field Artillery role in suppression is crucial—there is no second chance in this business. *We are convinced that these new procedures for suppression will work.*

*by Major General David E. Ott, Commandant,
U.S. Army Field Artillery School
in the Field Artillery Journal*

SURVIVABILITY

In the November 1975 issue of Aviation Digest, LTC George L. O'Grady, HQ MASSTER, Fort Hood, used the imaginary briefing reprinted here to discuss the survivability of the attack helicopter when operating as part of a combined-arms team. — Ed.

"Sir, survivability of the attack helicopter as an integral part of the combined-arms team falls into two general areas—hardware and tactics.

"*Hardware* to improve weapons, reduce visual and electronic signatures, increase maneuverability and decrease vulnerability will continue to be developed with a healthy research and development (R&D) program.

"*Tactics*, on the other hand, can be addressed and good tactics implemented now by using current machines and weapons. Tactics, if developed to the advantage of the helicopter, will be directly related to survivability. The tactics to be considered are derived from the principles of attack helicopter employment and combined-arms employment.

"Principles of aviation employment are outlined in FM 90-1, employment of Army Aviation in a High Threat Environment. Specific attack helicopter employment procedures include:

- Engage the enemy at maximum effective range, disengage prior to his maximum effective range.
- Engage first.
- Have an egress available throughout the engagement.
- Engage with the greatest violence available.
- Avoid duels with any enemy weapons.
- Preplan engagements to use ordnance delivery by other weapons sources to complement helicopter firepower on the intended target or to divert enemy attention, thus reduce his target acquisition capability and

reduce the chances of his engaging the helicopter.

"The helicopter is and will continue to be a relatively "flimsy" machine. It cannot tolerate severe punishment—be it from enemy firepower or the stringent environment of flight. It carries but limited ordnance loads when compared to conventional close air support (CAS) aircraft. The employment tactics differ from conventional CAS aircraft because helicopter advantages are the high-speed fixed-wing aircraft disadvantages and vice versa.

"The attack helicopter does not bomb a target. It is far too slow to approach and depart the target with a bomb. The speed of the fixed-wing aircraft allows heavy ordnance including dumb or smart bombs to be employed. Because the helicopter is slow, it has several advantages over airplanes. It can fly lower, turn faster, and even stop when closing on the enemy. It has weapons that can be fired off-axis thus bringing fire on targets of opportunity faster than deliberate fixed-axis delivery weapons associated with airplanes.

"Airplanes carry more ordnance; helicopters are more discriminatory with less ordnance. One complements the other and under many conditions they can and should be employed together. Unfortunately, dual employment is a little discussed subject. As attack helicopters and even Tacair (tactical air) have learned to work in conjunction with artillery, so should Tacair and attack helicopters learn to work together. Specifically, given a target that has air defense, a coordinated attack can be planned. If helicopters and Tacair are sent against the target, the air defense would be alert and most concerned with the obvious threat—Tacair. As the counter engagement is concentrated on the airplanes, the helicopters can attack, causing disruption in the air defenses thus allowing the airplanes to concentrate the attack on the intended target. Current doctrine does not consider this approach. Basically, training, understanding, and common communications links by any type radio would make it possible.

"Other combined-arms concepts apply to the helicopter if the helicopter is considered a ground combat vehicle. The air cover required for any ground combat operation applies equally well to the helicopter. The major difference in a ground combat vehicle and an attack helicopter is not the dimension of air movement, rather the mobility or rapidity of movement the helicopter has compared to jeeps or tanks. A screening action by a ground force or reconnaissance mission requires coordinated action. The helicopter can have a dual purpose. It can be the eyes or an element of the supporting firepower.

"The attack helicopter can be artillery support, particularly if the mission area cannot be covered by conventional artillery. The attack helicopter has extended time-over-target. Tacair on call has a definite reaction time or, if airborne, is limited in its time-over-target. The attack helicopter can be brought forward and positioned for quick reaction. Often times in less than optimum weather conditions the attack helicopter will have to replace Tacair. It will never carry the heavy ordnance of Tacair but with a 200-foot overcast and 2 miles or less visibility, something is far better than nothing. Sur-

vivability then is survivability of the whole force, not just the helicopter portion.

"Survivability of the attack helicopter is fact now. With current equipment and improved training, survivability will be the result of a well planned combined-arms mission. The known and suspected deficiencies of current and near term equipment will continue to be addressed by the R&D (Research and Development) community. Success in hardware programs will not alter the field commander's tactical employment significantly. They will assist the overall performance of attack helicopters and will be welcomed by the men who must use the equipment. Meanwhile, let's continue to employ innovative tactical concepts."

NIGHT AIRCRAFT MAINTENANCE

Army aircraft can be maintained at night.

Our accomplishments in the Republic of Vietnam prove the point. In *Airmobility 1961-1971*, Lieutenant General John J. Tolson states:

"The sight around the average company maintenance detachment when the birds staggered home in the evenings was a sight to behold. The maintenance crews rolled out, turned on the lights, worked with flashlights, worked by feel, worked any way, in the rain, in high wind and dust storms, all night long if necessary to patch up the aircraft, pull the required inspections, correct deficiencies and get them back on the line by the next morning. Night test flights, which are prohibited under peacetime conditions, were the rule rather than the exception."

To put this in perspective, however, recall that the low-intensity conflict in Vietnam, with its absence of a significant enemy air or artillery threat, permitted the use of semifixed installations with well-lighted hangars and ramp space for night maintenance operations. If the Army were facing a sophisticated enemy in a different environment, night aircraft maintenance would be a tougher task.

Two factors that have a direct bearing on night maintenance are shelters and lighting options. The Army's currently authorized aircraft maintenance enclosure, the 32-foot maintenance tent, was designed as a medium-sized shelter for use in the repair of tracked and wheeled vehicles. It's bulky and it requires considerable time to erect and disassemble. The shelter has a blackout capability, and it will remain the only aircraft maintenance enclosure authorized until distribution of the transportable helicopter enclosure and the relocatable maintenance hangar. These shelters are presently being developed, but they probably won't be available for issue before fiscal year 1980.

Aircraft not protected by the 32-foot enclosure are exposed to the elements, which in desert or arctic environments pose serious difficulties to an effective maintenance program. Also, night aircraft repair outside lightproof shelters limits the amount of light that maintenance units may use.

The amount of light available is the obvious difference between day and night operations. On a

sophisticated battlefield too much light at night could cause discovery and destruction, and too little light could prevent the accomplishment of maintenance tasks.

It's difficult to say just how much light is adequate. Modern Army Selected Systems Test Evaluation and Review (MASSTER) conducted a night aircraft maintenance exercise during the latter part of 1974 at Fort Hood, Texas. The object of the exercise was to evaluate selected aircraft maintenance and supply functions of a typical integrated direct support maintenance element in a tactical night environment using various lighting options. Lighting options studies were chemiluminescent lights, head lanterns, and night vision goggles.

The conclusions drawn from the exercise were—

- Aircraft maintenance and supply functions can be performed as effectively at night as during daylight.
- The performance of aircraft maintenance and supply tasks at night is feasible under subdued or blackout lighting conditions without marked degradation in productivity or quality.

- Electric head lanterns, fitted with red or green filters, are the most productive lighting option, though unfortunately the most vulnerable to detection.

The greatest opportunity for improvement in the shortest period of time seems to be through improved individual and unit training.

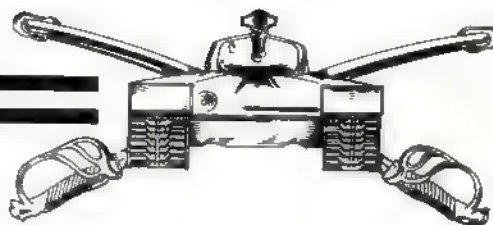
Current night maintenance training is clearly inadequate. There is no hands-on night maintenance training in our service schools today.

Training for night maintenance operations requires more than turning off the lights. Personnel must be shown the different techniques that should be used at night. Included should be instruction and practical demonstrations on the loss of depth and color perceptions, as well as the loss of the function of cones in the eye, resulting in a night blind spot. This blind spot creates severe safety hazards unless personnel are trained in the proper way to see at night.

Some people may wonder why the Army needs a night maintenance capability. The answer is that maintenance requirements in a conventional conflict against an enemy that possesses considerable air, missile, and sensor capabilities will increase dramatically over what we experienced in Vietnam. In order to maintain aircraft availability, aviation and aircraft maintenance units probably will find themselves working day and night. Another reason for night maintenance will be the mobility requirements of future conflicts. Army aviation operated from enclaves in Vietnam, but in conventional conflicts there will likely be a much greater reliance on base camp mobility. Except for contact teams, maintenance operations cease during packing, moving, and unpacking phases; thus, when a unit completes its move it should catch up on deferred maintenance by working at night.

Simply stated, we can't expect our aircraft to fly day and night without providing them with adequate and responsive day and night logistics support.

by Major Ted A. Cimral in the January-February 1976
Army Logistician. □



SERVICE OBLIGATIONS

A service obligation is a period of time that an officer is obligated to remain on active duty. An officer is not normally allowed to resign, retire, or be released from active duty until he has satisfied these obligations. Each officer has a precommission obligation which varies in accordance with the program under which he was commissioned and entered into active duty status.

Precommission obligations will be served in full and concurrently with obligations incurred as a result of active duty courses of instruction. Time spent in excess leave status or in attendance at civilian institutions prior to entrance on active duty is not credited toward the precommission obligation.

For Reserve officers, a 1-year obligation, in addition to the initial obligated tour, is incurred upon acceptance of a VI/CVI category (AR 135-215). Other obligations are incurred as a result of military and civil schooling and permanent change of station. Schooling obligations are computed from the date of course completion or termination of attendance thereat, whichever is earlier.

Normally, where more than one obligation is incurred, excluding precommission obligations, the total obligation will not exceed a maximum of 4 years. Service while attending an active duty course of instruction subsequent to another active duty course is not credited toward the obligated service incurred by the initial course. Compounded obligations as a result of active duty courses will be served consecutively. If an officer receives assignment instructions which would entail a service obligation which he does not desire to accept, the officer has 30 days from receipt of the alert or assignment instructions, whichever is earlier, to submit his resignation, request for Release from Active Duty (REFRAD), or retirement; otherwise, the assignment is firm and compliance with the orders is required (AR 636-100).

OFFICER REQUISITIONING AND ASSIGNMENT

Many officers have called and requested assignment to specific locations or units in CONUS or overseas only to be told there is no current requirement there. In some cases, the call may have been prompted by a letter from a friend who wrote that their unit was short five captains with no replacements on the way. An explanation of the officer requisitioning system and where Branch fits in should assist in your understanding of why Branch may not be able to send you to your desired location.

Each quarter MILPERCEN determines a Projected Requisition Authority (PRA) for the major commands. As

defined in AR 614-185, the PRA is a single source document which allocates officers by specialty and grade to major commands and activities in accordance with established priorities and approved authorizations, and provides the basis for validation or requisitions. The PRA fluctuates because it is tied to variables such as the force structure, Army end-strength, and priority of the command.

Major commands and installations submit personnel requisitions to DA based upon the grade and specialty limitations contained in their PRA. MILPERCEN, in turn, validates those requisitions which are within the limits of the PRA and forwards them to the various career branches. Each branch is responsible for filling validated requirements on time with the best qualified officers available. Unfortunately, there are not enough officers available to fill all TDA/MTOE positions worldwide. The PRA provides for an equitable distribution of the Army's officer shortages in accordance with the DA Master Priority List.

The distribution of these shortages in the field, and hence allocation of officers within a command, is done essentially at the discretion of the major commanders concerned. Except in rare instances, Branch cannot make "pinpoint" assignments. Branch may recommend utilization of an officer based upon his experience, interest, and professional development needs, but cannot direct such utilization or assignment. The commander is responsible for the utilization of his resources, with the prime objective being the accomplishment of his mission.

BRANCH VISITS AND BICENTENNIAL CROWDS

Bicentennial visitors in horde-like configurations have already begun their advance on historic Washington. So, if you are planning to visit Armor Branch this summer, be prepared to find no room at the inn unless you have made reservations ahead. Remember too, a journey here this summer may be more than what is normally a breath-taking financial experience. Thus, if we can answer your questions on the phone (Autovon 221-9696, 9658, 7849) or by writing, we'd be happy to do so. On a limited basis, transient BOQ space is available at the following locations.

Andrews AFB	858-2606
Boling AFB	297-5878
Ft. Belvoir	354-6610
Ft. Myer	222-9603
Quantico	278-3148

Travel time to MILPERCEN is approximately 20 minutes from each installation except Quantico which is 40 minutes. Reservations need to be made 2 - 4 weeks in advance. ☐

CLGP—THE SMART ROUND

The "smart round"—a maneuverable projectile capable of overcoming target location errors and hitting moving or stationary hard point targets through laser technology is being tested for integration into field artillery and possible eventual issue to troop units.

The system, technically termed the *Cannon Launched Guided Projectile (CLGP)*, consists of a 155-mm laser-guided round and laser designator which is operated by the observer teams of the direct support (DS) 155-mm battalions.

The CLGP round is somewhat heavier and longer than the standard 155-mm high explosive (HE) fragmentation round. The added weight and length allow for a laser sensitive seeker, guidance and control equipment and a shaped-charge warhead to be packaged into the 155-mm projectile. Due to increased weight and drag, the CLGP loses some range by comparison to the standard 155-mm HE round. However, since CLGP responds to reflected laser energy from the Ground Laser Locator Designator (GLLD), this limitation is not critical. The opportunity for first round hits, even on moving targets, more than makes up for range limitations. The CLGP round requires laser illumination, termed designation, from the GLLD. This provides energy which the CLGP seeker can detect, acquire and to which it can maneuver. The GLLD, when fully developed, is planned to be man-portable or operable from a vehicle. Additionally, the GLLD will have a night sight which will significantly increase the FO's ability to detect and engage targets in darkness with CLGP or other artillery munitions.

Preliminary analysis of a cost and operational effectiveness analysis (COEA) being conducted at Fort Sill to test the CLGP gives promise of a system that is vastly superior to anything yet developed for the attack of moving or stationary hard point targets by the field artillery.

ROCKET FLARE

A flare warhead developed for the 2.75-inch aircraft rocket will give helicopter units the capability to carry and employ their own target illumination assets.

An advantage of the rocket-deployed flare is that the aircraft does not have to overfly the target, enabling the pilot to fly nap-of-the-earth, pitch up, fire one or two flare rockets and then move to a new location.

Flare ignition at the ideal altitude of 2,000 feet will provide 2 minutes of usable illumination. Nominal range of the present XM-257 warhead is 3 kilometers.

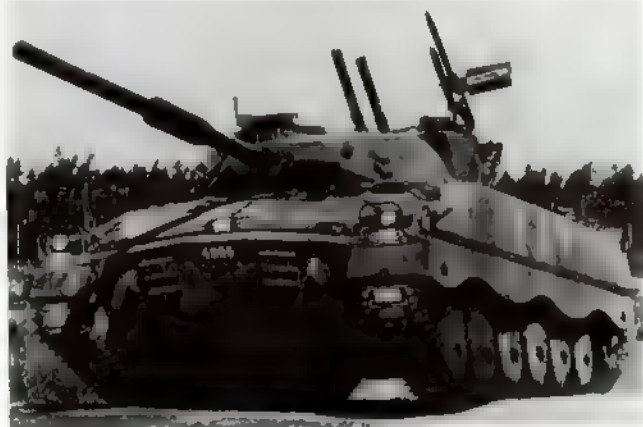
The flare descends at about 13 feet per second and provides in excess of 1 million candlepower of illumination which will cover a circular area 1 mile in diameter.

NEW SWEDISH ANTITANK VEHICLE

A new Swedish antitank vehicle, the *Ikv 91*, was recently delivered to the Swedish Army. The amphibious 15.5-ton vehicle is equipped with a 90-mm, low-pressure gun, and features low ground pressure, which is said to give it outstanding cross-country mobility. The *Ikv 91*'s engine is a 330 h.p. Volvo-Penta 12-litre diesel (commercial type), and allows the vehicle a maximum road speed of about 43 m.p.h.

The gun is mounted in a power-operated 360° traverse, low-silhouette turret. A periscopic sight with laser rangefinder and an advanced fire control system with a ballistic computer is said to assure very quick first round hits, even on fast moving targets at long ranges. The *Ikv 91* is served by a four-man crew.

(Courtesy Swedish-International Press Bureau)



The *Ikv 91* was developed for employment with infantry brigades and the special defense brigades of the northern Swedish territories.

ROLAND UNDERGOING TESTS

The European-developed *Roland* short-range air-defense missile system is currently undergoing tests at White Sands Missile Range, New Mexico. A cooperative venture among Germany, France, and the United States, the test program is designed to provide more test data which can be used to reduce DT/OT II test requirements for the U.S. *Roland* system.

Selected earlier this year to meet the U.S. Army's requirements for an all-weather, short-range, air-defense missile system, *Roland* consists of search radar, tracking radar, and two launcher arms mounted on a turret atop a single vehicle. Its fire control unit features a computer, and associated displays and control equipment for both the commander and gunner. Each *Roland* fire unit will carry 10 missiles, two ready for instant launch and four additional rounds in two magazines on each side of the system. Reloading is automatic.



'OLD BILL' PLAQUE PRESENTED TO MUSEUM

LTC Burton S. Boudinot, Secretary-Treasurer of the Armor Association, unveils a bronze plaque of "Old Bill," as Mrs. Emert L. Davis, President of the Cavalry-Armor Foundation and MG John K. Boles, Jr., USA-Retired, President of the United States Armor Association, look on. The plaque, a gift to the Patton Museum,



symbolizes the close relationship of the Armor Association and the Museum, and affirms a \$10,000 pledge by the Association to the Museum for the planned construction of Phase III. Reproductions of the plaque (above) will be made available to members of the Armor Association.

BELGIUM'S NEW TANK HUNTER

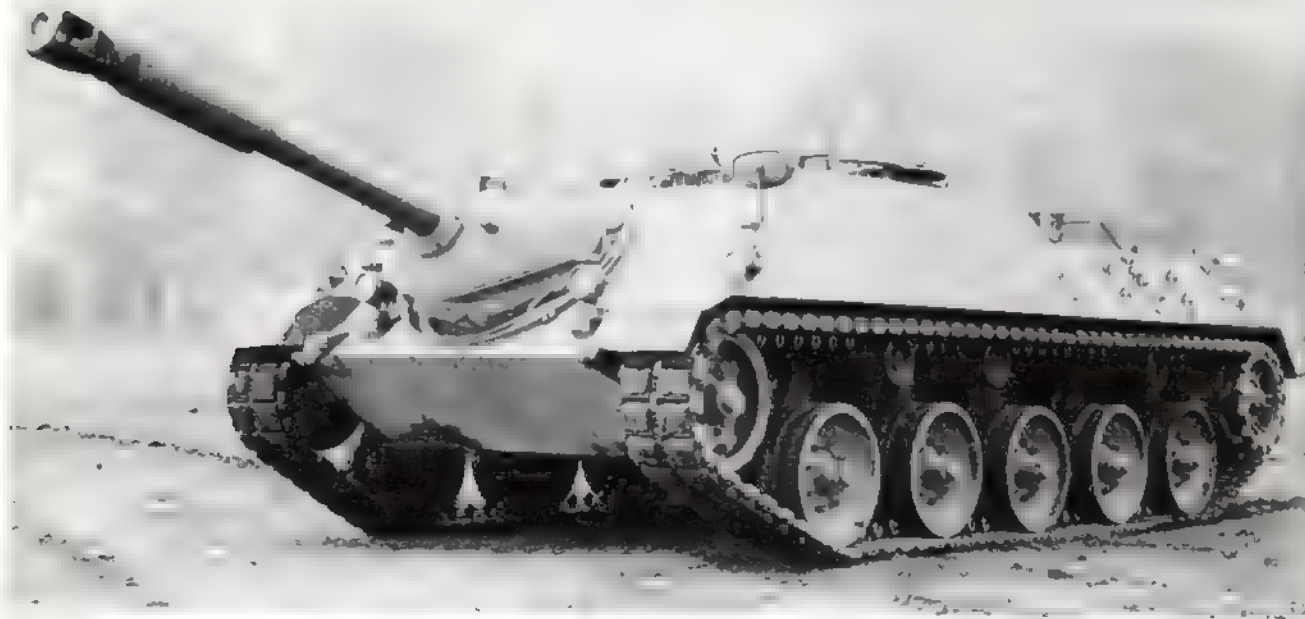
Belgium recently added a new antitank vehicle, the *JPK (Jagdpanzer Kanone) 90-mm-Neu*, to its inventory upon selection for its high mobility and maneuverability, its armament and low silhouette.

The *JPK 90-mm-Neu*, looks similar externally to its predecessor, the *Kanonenjagdpanzer*. The adoption of the Marder transmission system and suspension, the introduction of an angular deviation indicator, and the fitting of the *SABCA-Cobelda* fire control system are

some of the important modifications incorporated into this new version.

Gun traverse is limited to 15° on either side, and -8° to +15° in elevation, but is compensated for by the integration of hydraulic clutches, allowing the vehicle to be pivoted very rapidly.

Ninety-eight percent first round hits at 1,500 meters were recorded at firing trials. The vehicle carries a three-man crew and has an automatic loader.



PATTON: A STUDY IN COMMAND

by H. Essame. Scribners. New York. 1974.

Many efforts have been made since the end of World War II to penetrate the war's veil of obscurity in order to describe the men and events of that climactic struggle. Buoyed by the hope that the lapse of 30 years and the immense body of knowledge now available will yield final judgments on heretofore chronic controversies, writers of all caliber continue to re-examine World War II's diversity. Although even impeccable scholarship cannot resolve many arguments of strategy and tactics, it is indeed fortunate that many of these new books are being written.

In view of all that has been written about General George S. Patton, Jr., it is somewhat surprising to be able to herald the publication of a significant new work on his career. The title is genuinely descriptive of Essame's book — it is a study of command as exercised by Patton, principally during World War II, but with coverage of those events and experiences of Patton's background which the author regards as influential.

Its appearance should finally establish the reputation of Major General Essame as a military historian of the highest quality. General Essame, retired from the British Army in 1949, brings to his labor a lifetime of military service which spanned both World Wars, lending genuine credibility to most of his observations. One of the themes deriving from this experience which repeats itself in several of his books, including this one, is that the overriding problem at the front is the maintenance of morale. His praise for Patton, generally fulsome, is never more unstinting than in regard to Patton's ability to maintain the morale of Third Army in times of adversity, such as the Lorraine Campaign, as well as during Third Army's great triumphs. Patton, and the influence of his family background and connections on his personality and leadership qualities, is frequently compared in his flair for publicity and hold on his troops with Field Marshal Montgomery.

General Essame is very sensitive to the challenges involved in the conduct of

a major war in an alliance framework. While by no means discounting the fairly constant controversy between the British and U.S. partners (not to mention the Free French, Canadians, Poles, etc.) he basically gives the alliance good marks. Of particular interest is his perception of the relative contribution to the war effort being made by the British and U.S. members at various points in the campaign and what this meant in terms of command billets, and even strategy options. His analysis is that as the American contribution in men and materiel began to overshadow the British capability, it was altogether logical for U.S. senior commanders, press, and public to expect the U.S. to have the major roles in the final battles and the accompanying glory. He also helps the American reader understand better Montgomery's great caution and detailed planning later in the war, as we come to realize that for fundamental manpower and resource reasons, he was commanding "Britain's last Army."

Many will dwell on Essame's strong assertions concerning Eisenhower's failure on five distinct and specified occasions to achieve decisive victory through proper use of Patton and Third Army. Clearly, Essame feels that Eisenhower extended the war unnecessarily into 1945 by not giving the resources to Patton to complete the job begun after the breakthrough at Avranches. Here we enter the realm of still unresolved controversy.

One of the five faulty decisions attributed to Eisenhower is the failure to direct Patton to drive north from Argentan toward Falaise to seal the escape routes of the German Seventh Army, all but trapped in the Falaise-Montain pocket. Patton, himself, is reported to have been convinced to the end of his life that this was a major lost opportunity. That the controversy will not die so easily is perhaps adequately illustrated by the vignette told by Constantine FitzGibbon in his introduction to Ballentine's War Leader Series book on Patton, by Charles Whiting.

FitzGibbon reports the details of a personal encounter in August 1944 when General Bradley, accompanied by General Patton, asked FitzGibbon, an order of battle officer in Bradley's CP, if he "had any evidence that day of a German withdrawal from the pocket." FitzGibbon's negative reply was drowned out, he reports, by an outburst from

General Patton contradicting him and reporting that he personally observed them streaming out of the pocket that morning. FitzGibbon infers, therefore, that Bradley's acceptance of Patton's, rather than his staff's, judgment on the actions of the Germans at that time places a part of the responsibility for this faulty tactical judgment on Patton himself.

Essame's review of the slapping incident in Sicily is masterful, and perhaps deserving to be the last word on that subject. His treatment of this sensitive aspect of Patton's life, and democratic leadership in general, reaches this rewarding level because Essame is a true language craftsman. The whole book is eminently readable, with many notable passages, including in my opinion, the summation of the slapping furor: "In the heat and dust of a Sicilian summer, he had come up against a human problem he did not fully understand in an evacuation hospital and found the wrong solution."

The readers of *ARMOR* will have no trouble accepting General Essame's final assessment of Patton, but it is perhaps unusual to record from a competent British writer such accolades as "It is with the great commanders on the battlefield itself that he stands comparison: with Murat, Sherman, Forrest, Stonewall Jackson, Manstein, and Rommel... A quarter of a century later, it can be confirmed that in mobile operations he outshone with startling brilliance in imagination, technique, and achievement his Allied contemporaries."

Colonel Jess B. Hendricks, Jr.
USACGSC

SOVIET MILITARY STRATEGY
(Third Edition) by V. D. Sokolovsky (Edited by Harriet Fast Scott). Crane, Russak & Company, Inc. 494 pages. 1975. \$17.50.

"The internal conditions of the Soviet Union do not require the existence of an army. However, as long as there remains a military threat from the imperialist camp, and a complete and general disar-

mament has not been achieved, the CPSU deems it necessary to maintain the defensive power of the Soviet Union . . ."

With this statement of purpose, the Soviet Union maintains, what is considered by many, the strongest military establishment in the world. *Soviet Military Strategy* provides the Western nations with an insight into the Soviet establishment's concepts of modern warfare. This work, originally edited by Marshal V. D. Sokolovsky, was published in 1962, with later revisions appearing in 1963 and in 1968. The original edition was nominated for the 1969 Frunze Prize, an annual award for the best writing on military theory or military history, and is an indication that official approval has been given to the views expressed within the work.

The Strategic Studies Center of the Stanford Research Institute's version, with its analysis and commentary by Harriet Fast Scott, has provided the military reader with an excellent version of this important Soviet work. The editor is currently a senior Soviet military-political analyst with the Strategic Studies Center, and has authored numerous books and articles on Soviet military doctrine and strategy. She has gone to great lengths to explain the important aspects of each chapter in a chapter commentary and to trace the changes between each edition of the work and its significance.

While this edition will probably not have the impact that the first edition had on the Western nations, there exists a wealth of valuable information, and the commentary and analysis greatly enhance this edition's value to the lay reader.

The reader, once he becomes accustomed to the rhetoric of the writer, may find several chapters of more than usual interest: a chapter on the Soviet perception of the U.S. and NATO's military and political strategy, with a rather detailed description of our force structure in 1968; another chapter deals with the history of the development of Soviet military strategy and a chapter on the nature of war. Of particular interest is a section on the Soviet military view on a limited war in Western Europe. One section which may irritate the reader is the section that presents the Soviet views of the American and Allied contributions to the victory of World War II. The reader is advised not to lose sight of the overall value of this book while reading this section.

This version is strongly recommended to all serious military readers, and particularly to those who have attained, or

aspire to attain, positions in which they could possibly influence our military and political strategy. The unfortunate aspect of this work is that the effects of the October War are not revealed because this edition was written and translated prior to that event. But this fact does not detract from the principal value of the book — a chance to "know thy enemy."

Captain Albert F. Leister, Jr.
University of Washington

ARMIES OF THE AMERICAN REVOLUTION

by Ian V. Hogg and John H. Batchelor. Prentice Hall Inc., Englewood Cliffs, N. J. 160 pages. 1975. \$14.95.

Any of *ARMOR's* readers who are familiar with John Batchelor's earlier books like *Tank* and *Artillery* will recognize the same profusely illustrated, free style here. Ian Hogg, who collaborated on *Artillery*, has combined with Batchelor to write a cursory overview of the American Revolution much in the matter of the popular *Time-Life* series on American history.

While the book purports to review both revolutionary armies, it primarily addresses the weapons used — muskets, rifles, pistols, swords, sabers, and artillery pieces — and draws some brief conclusions about training, the military advantages from weaponry on either side, and the quality of logistical support. It's really more of a potpourri of superficial discourse, interspersed with a mixture of Batchelor's illustrations and historical paintings and engravings.

Naturally, the illustrations are a predominant part of the book (there are over 90 full page illustrations). The accompanying text on weapons is fairly comprehensive, though perhaps not as definitive as some gun buffs might prefer. Hogg is obviously much better acquainted with weapons than with military history, and includes several interesting asides, such as his comments on Captain Ferguson's breech loading musket. The pictures are well done and the overall effect is sufficient to capture your interest. It's easy reading (you can finish it in an evening), and would make a fine gift for a youngster starting to show interest in his American heritage.

Colonel (Retired) John R. Byers

THE AMERICAN INTELLECTUAL ELITE

by Charles Kadushin. Little, Brown and Company. 389 pages. \$8.95.

Calling his work "a sociological history of leading American intellectuals of the late 1960's" Kadushin's findings are provocative, sometimes amusing, and usually counter to the prevailing public attitudes about America's intellectuals.

Whether referred to as the literary Mafia, the eastern intellectual establishment or a group of "effete snobs," members of the American intellectual elite are generally considered to be a homogeneous collection of radicals holding leftist persuasions, whose pronouncements radiate weighty influence and authority across the nation. According to Kadushin, none of this is so.

His examination is broad: it consists (among other aspects) of defining and describing terms, such as *intellectual*, *social role*, *value concepts*, and *social circle*; and proceeds to a lengthy inquiry which answers such questions as, *where do intellectuals live? what do they do for a living? what is their religion, age, class, sex, and political and historical outlook?* etc. He examines the journals they write for, dissects the circles of power which form around them, and traces the patterns of who talks to whom . . . and why.

Answers to these and similar questions reveal that the intellectual elite is not very different than most well-educated Americans. The American intellectual elite is fallible, prone to self-criticism, disorganized, more liberal than radical, and is generally politically ineffective.

But he is unlike the "average" well-educated American, too. In his role as an intellectual, he stresses high quality and creativity; he is "one who is an expert in dealing with high-quality general ideas on questions of values and aesthetics, and who communicates his judgments on these matters to a fairly general audience"; he is concerned with public policy and human affairs; and, he is more preoccupied with pragmatic thought than with moralizing.

Kadushin's study reveals an essentially ineffective American intellectual elite movement or philosophy. His findings tell us that they followed, rather than led, and that they offered few useful solutions to crucial issues of the 1960's.

Although Kadushin's characteristics of the American intellectual elite fly in the face of those ideas and images held by a

Information concerning the availability of professional books may be obtained from the U.S. Armor Association, P.O. Box O, Fort Knox, KY 40121.

large number of the American public, they support in many ways similar conclusions drawn a decade earlier by Richard Hofstadter in *Anti-Intellectualism in American Life*. If we would read both of these important books, maybe most Americans would come to understand the value of the man who can resist temptations of involvement in power, complicity of moral choice, and degradation of contemplative action. The intellectual is of great value to the nation because thought as opposed to action has its place and, although he may be less than totally effective, the thinking man should not be ridiculed or cast aside

Major Gordon T. Bratz
Armor

AGAINST THE TIDE: An Argument in Favor of the American Soldier

by Peter B. Petersen. Arlington House Publishers. 287 pages. 1974. \$9.95.

For a number of years, it has been popular in literary circles to pillory the military services, the Army in particular. Fed by antimilitarism growing out of the Vietnam War, disgruntled soldiers, and pseudo-intellectuals looking for sensational pulp, this plethora of invective finally began to drown in its own flood as

readers tired of the repetition. Thus a book supporting soldiers is almost unique, and the great amount of research, interviews, and detailed analyses forming the basis of this book led many readers to hope that this might be the strongest rebuttal yet

Those readers are still going to have to wait awhile. Despite the high hopes held for it and its sound recommendations, this book needs major editorial surgery to make it good reading. It is composed primarily of Petersen's three academic works: his master's thesis on beliefs of OCS students, his doctoral dissertation on the effect and stability of OCS training, and his Army War College research project. To these, he has added an introductory comprehensive review of contemporary criticism of the American soldier (really the best part of the book!), a brief study of selected soldiers in Petersen's battalion in Vietnam, and a study of the problems in retaining young OCS graduates in service. Each of these studies has been reduced and summarized in a separate chapter, and the text is replete with factual data, charts, and references. But the book as a whole suffers from major defects

First, while each study provides original, significant data, the studies are not sufficiently related to the stimulating review of current literature, either to refute their arguments, or to provide continuity throughout the book. And, while the author has tried to simplify his text and translate it from the behavioral scientist's argot into everyday English, the result is a pedantic, often inarticulate manuscript, that reads more like a textbook than an argument in favor of the American soldier.

Secondly, the book suffers from inadequate editing, primarily in repetition. For

example, the author used an evaluation form called *The Job Analysis and Interest Measurement (JAIM)* in most of his studies, and the description of the JAIM, its methodology and analysis are repeated in nearly every chapter. Even within chapters portions are repeated, giving the reader the impression that sections were written at different times and pulled together later without any review to eliminate redundancy

The book concludes that many of the current myths about soldiers are just that — myths. Training doesn't create robots; Vietnam veterans are still good citizens, junior officers leave service for many reasons and not just because some of them may be oversupervised, few senior officers are concerned only with advancing their careers; and popular images of "Beetle Bailey" enlisted men and naive junior officers have few serious believers. The author infers these conclusions from his analyses of collected data; the reader unfamiliar with behavioral science techniques may find it a bit more difficult

In summary, while this book is probably a useful reference for scholars, it inadequately refutes the attacks in contemporary antimilitary literature, nor does it add materially to the general military reader's knowledge. If you're still interested, borrow a library copy to read

Colonel (Retired) John R. Byers

Did You Know?

George Washington gave up command of the Army two days before Christmas of 1783 (for which ceremony just 20 people managed to be present). The year 1784 started off with some four million Americans in full possession of their independence and approximately 800,000 square miles of real estate. The Army at this time numbered 700 rank and file. But even this diminutive force (about the size of a modern infantry battalion) was considered "inconsistent with the principles of republican governments, dangerous to the liberties of a free people," and might be used as an active agent in "establishing despotism."

So the Army—if it could still be dignified with that word—was reduced to 25 men at Fort Pitt and 55 at West Point. Their mission was to guard military supplies left over from the Revolution and stored at these two posts.

From *Army Lore*
by Mark M. Boatner, III
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FROM THE EDITOR

Based on questions that we have received from many of our readers, I feel there is a need to clarify a few specific areas of interest concerning the publication and distribution of the magazine.

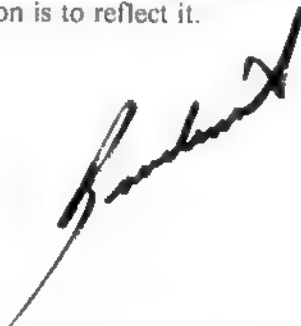
The publication of *ARMOR* was taken over from the Armor Association by the U.S. Army Armor School in March 1974. This resulted from a 1973 Department of Defense directive specifying that active duty military personnel would no longer staff professional associations. At that point, the Association had had a military staff for 88 years and published its journal for 85 years. Now, *ARMOR*, as an Army branch periodical, is governed by AR 310-1 which prohibits, among other things, the publication of routine personnel actions concerning assignments and promotions, or articles that glorify a living individual. So, there went the feature "Tarpaulin" which so many of you liked. We are trying to change this rule.

As to circulation, the Armor School makes free distribution of the magazine to all armor unit headquarters and other selected agencies. The Armor Association buys those copies from the Army that it needs for its subscribers. *ARMOR* is the Army's oldest professional journal and one of the most respected throughout the world's military.

A comment on advertising—it is an absolute "No-No" in a branch periodical.

For a short time, we did feature selected items from the Armor School Bookstore until it became a part of the PX and was directed to get out of the mail order business. The Association, however, recognizes the problem many of you have in obtaining "esprit items" and professional books. Hopefully, Association members have received encouraging news on the subject in the mail.

Now a word on magazine contents and articles. Except for a couple of departments and features, *ARMOR* is a journal of submitted contributions. There are no assigned field reporters or battery of staff writers. I do solicit articles from known experts, but pieces are on the most part the unsolicited effort of an author. I suggest that if you are interested in a particular subject, then study it as other authors have before and then write about it. Manuscripts should contain 2,000 words or less and should be triple-spaced. Pictures accompanying manuscripts should be black and white glossy prints of good contrast. Sketches and drawings should be of sufficient clarity to ensure accurate reproduction by our artist. I only wish more knowledgeable people, experienced in their areas of interest, would write for *ARMOR*. Our journal is read worldwide. It is a forum for the exchange of ideas. I want to keep it the fine journal you say it is, but you must write the articles, professional thoughts or letters to the editor that are needed to sustain reader interest and generate stimulating dialogue. There is such a thing as "Armor Philosophy" and *ARMOR*'s mission is to reflect it.



The annual Armor Conference and US Armor Association meeting scheduled for 19-21 May at Fort Hood, Texas was cancelled. **MORE INFORMATION WILL BE FORTHCOMING.**

Coming in **ARMOR**

"BRINGING THE BATTLEFIELD TO CLASS"

Constrained by a lack of training area, the Armor Branch of the ROTC detachment at the Virginia Military Institute has devised a "Tanker's Game" which creates a realistic combat situation for small unit tactics indoors.

"AIRSPACE MANAGEMENT"

The case against airspace management in a wartime environment is discussed by Major Joseph C. Gross, III. He presents an alternate plan for controlling Army aircraft in which he considers them as being just another combat vehicle operating in the battle area.

"A GOOD TANK MISUSED"

The history of the French CHAR B tank is traced by Raymond Surlemont, showing its evolution between 1921 and 1940.

"D TROOP MAY BE MISSING"

In his Professional Thought, Lieutenant Colonel M. D. Mahler continues the discussion of the D Troop myth first described in ARMOR by Brigadier General Hugh J. Bartley and describes his battle to retain his D Troop when he was a Cavalry squadron commander.

"PATTON AND THE HAMMELBURG MISSION"

Lieutenant Colonel Frederick E. Oldinsky utilizes personal interviews with the leader of the Hammelburg mission and with Patton's relatives to examine the controversy surrounding this ill-fated raid behind German lines.

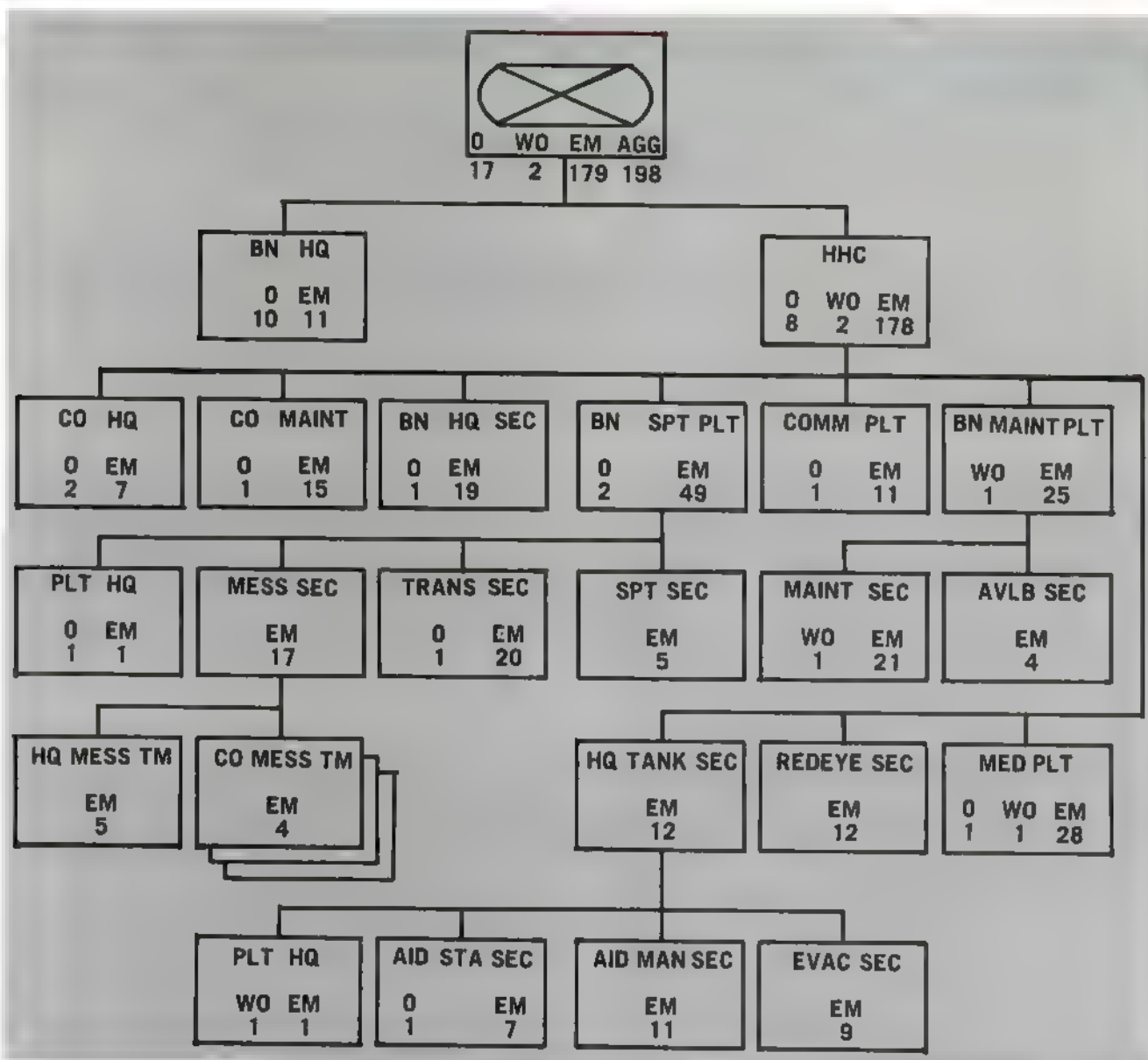
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on the armor-dominated battlefield.

The basic building blocks of an effective combat division are well organized, effective combined-arms platoons (figure 1). The importance of the platoon as an efficient fighting force is well documented, as is the criticalness of combined-arms operation—even at that level of organization. The foot soldier as we have known him can no longer survive alone—and neither can the tank. The proposed combined-arms platoon is an organization consisting of three main battle tanks (MBT), with four-man crews, and two armored fighting vehicles (AFV) capable of transporting seven infantrymen each. The most attractive aspect of this organization is its ability to fight as a self-sufficient armor-killing unit. It should be emphasized at this point that by permanently integrating infantry and armor soldiers at the platoon level, a number of inherent advantages are realized. They include:

- *Flexibility during combat.* Infantrymen can become replacements for tank crewmen and tank crewmen whose equipment is destroyed can fight as infantry. Task organization down

- *The requirement to cross attach or reinforce is eliminated.*

Each of the advantages listed above provide capabilities that will be invaluable in the heat of battle. As the unit expands and builds from the platoon all the way to division level, the importance of these factors becomes even more pronounced.

The proposed combined-arms company is illustrated in figure 2. Here again is a unit that attains the important objectives outlined earlier. It has a high armor-defeating capability, can provide its own security, and can seize and hold terrain if necessary. Assisted by its slimmed-down design, the combined-arms company can accomplish these and other missions by applying maximum combat power at the decisive place and time, while minimizing the effects of undue exposure to its personnel. The company commander is provided with his own, immediately-responsive, indirect fires. His unit is extremely flexible, as it is light enough to perform screening or reconnaissance missions, and heavy enough to fight effectively in major engagements.

By building upon the combined-arms platoons and companies, the battalion itself is a strong, flexible and highly mobile organization whose attributes include those inherent to its subordinate elements, plus those inherent to increased firepower and mass. Significant changes have been made to the combat support (CS) and combat service support (CSS) elements throughout the battalion. The effects of these changes are isolated primarily in the battalion headquarters

and headquarters company (figure 3)

In order to maximize the flexibility of the division, it is proposed that the division be organized in four brigades, each with three battalions (figure 4). Under this concept, the division commander can employ his brigades in echelons; a capability that employs depth to enhance control, flexibility, CS and CSS, and operations on a 24-hour basis. The proposed organization of the brigade provides a most important asset in the form of a scout/messenger unit which will prove to be invaluable in an effective electronic warfare (EW) environment. This unit will operate on trail-type motorcycles, be equipped with long-range secure communications, and possess a highly mobile tank-killing capability. It is important to note that two brigades are pure combined-arms elements. The other two brigades are each composed of a combined-arms battalion, an airmobile or mechanized infantry battalion, and a pure tank battalion, thereby further enhancing the commander's flexibility to meet any conceivable situation.

There are several other significant alterations considered essential for the division base. These include the addition of two field artillery battalions—one 155-mm self-propelled (SP) battalion for direct support of the additional brigade, and one additional 203 SP battalion for general support and general support reinforcing roles. Additionally, there are dedicated brigade contact/recovery teams in the DISCOM structure, a division combat intelligence company, and a combat aviation battalion. Each of these proposals is designed to provide the commander the increased combat staying power previously discussed.

Although each element of combat support and service support at division level has not been addressed, it is considered fully feasible to simply tailor the current organiza-

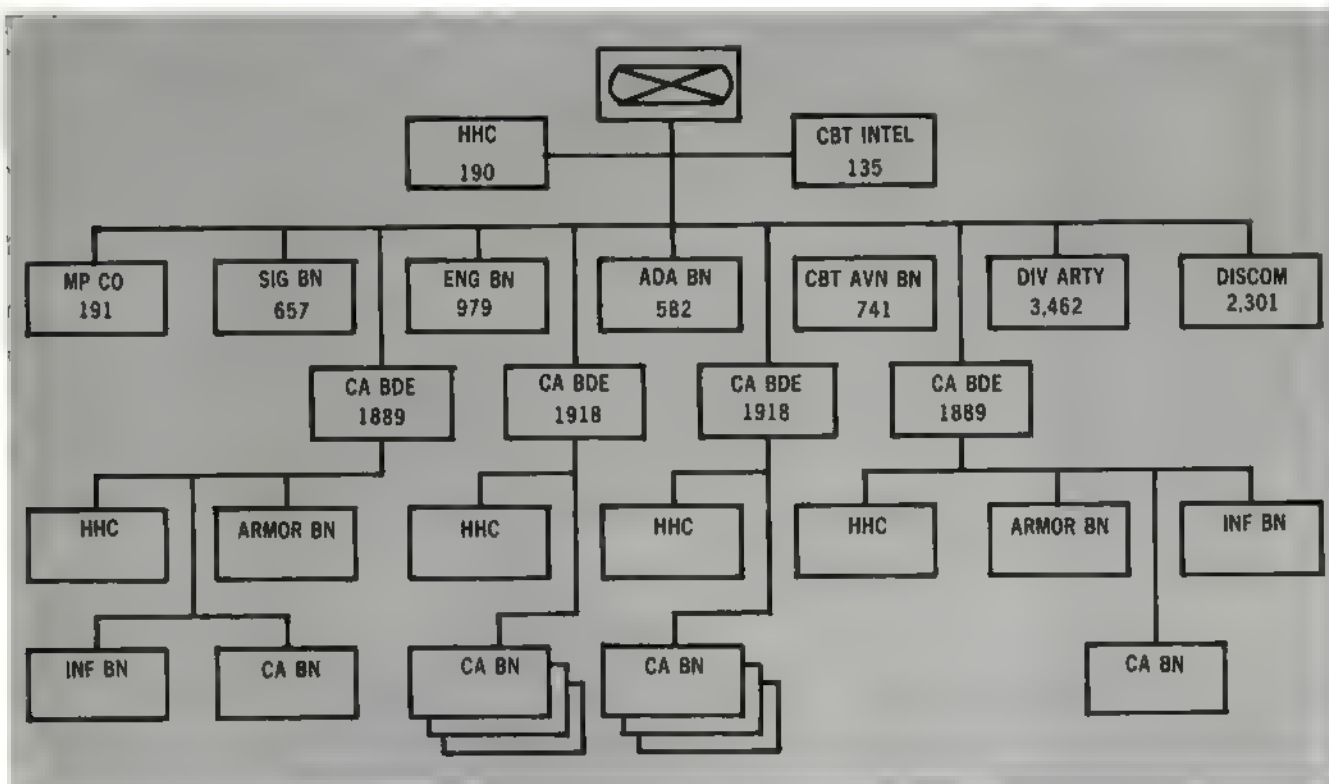


Figure 4. Combined-Arms Division

much more apt to "sway with the tide" and keep his record clean by denying knowledge of an operation that had failed, whereas Patton was always willing to "stand up and be counted" and accept full responsibility for his mistakes, as he certainly did in the Hammelburg incident. The diary entry of 18 January referred to above illustrates this point. Patton had just been informed that Bradley had been made commander of all ground troops in England when he entered the following in his diary:

"Bradley is a man of great mediocrity. At Gafsa, when it looked as though the Germans might turn our right flank. . . he suggested that we withdraw corp headquarters to Feriana. I refused to move. In Sicily, when the 45th Division approached Ofala, he halted them for fear of a possible German landing east of Termini. I had to order him to move and told him I would be responsible for his rear and that his timidity had cost us one day. He tried to stop the landing operation #2 east of Cap d'Orlando because he thought it was dangerous. I told him I would take the blame if it failed and that he could have the credit if it was a success. . ."

The fact that Patton was willing to take the blame for failure and give Bradley credit for success could very well have been repeated prior to the Hammelburg raid. However, as previously stated, this is only speculation and the absolute truth could probably not be proven one way or the other.

Be that as it may, there is little doubt that the partial failure of Task Force Baum was caused by insufficient strength. Note the term "partial failure," for in some ways the mission was a resounding success, proving at least in part that the raid was a sound tactical maneuver.

Raid Not A Complete Failure

Most of the critics of the Hammelburg raid give the impression that the entire task force was annihilated and accomplished nothing in the process. Statements have been made that 300 men were sacrificed to satisfy Patton's whim. The record does not bear this out. Interviews with captured German officers and official German records bear testimony to the fact that Task Force Baum accomplished the mission of creating a diversionary action. General Von Obstfelder believed that Task Force Baum would be followed by the 4th Armored Division and possibly the entire 3d Army because he still did not know they were swinging north. Other German units, elements of an estimated three divisions, were diverted to the Hammelburg area to stop Task Force Baum and to block the suspected follow-on attack. Some of those units would have been used against the Third Army in the north had they not been diverted. The effect of the diversion of those units on the subsequent advance of the 3d Army was evidenced by the fact that the 4th Armored Division didn't fire a shot for the first 90-100 miles in the attack.

In addition to creating a diversion, the Task Force inflicted considerable damage on the Germans while enroute to Hammelburg. Baum's forces had destroyed 12 German trucks, three tanks, three or four ammunition carriers, at least six locomotives and 12 trains, a number of anti-aircraft guns, disrupted troop movement schedules, notified the Air Force of a lucrative target (the marshalling area) at Ge-

munden, and captured over 200 prisoners. In addition, it can be assumed that the 700 Russian prisoners released around Grafendorf must have caused considerable problems for the Germans if for no other reason than requiring additional forces to be diverted to recapture them. The same was true of the liberated American POW's who chose to strike out on their own in an attempt to make it back to the American lines.

There was also the psychological effect on both the Germans and Americans. The Germans suffered a blow to their morale, both military and civilian, in the realization that their defenses were insufficient to prevent an American raid deep into their territory. The entire area was thrown into confusion and caused a great deal of panic. The American POW's were given a morale boost by the knowledge that they were not forgotten and a brighter outlook toward permanent liberation, since they learned from the task force how close the main American forces were.

The American casualty picture from the raid was not as dismal as that painted by the critics. Of the 293 officers and men comprising the task force, only nine were killed, 32 wounded and 16 missing. The remainder were captured and returned at a later date.

As for Colonel Waters, both he and Captain Baum were liberated, along with the other wounded American prisoners, by a task force from Combat Command B of the 14th Armored Division commanded by Lieutenant Colonel James Lann of the 47th Tank Battalion. The rest of the prisoners had been moved from the Hammelburg camp shortly after the raid by Task Force Baum.

Conclusions

This writer disagrees completely with John Toland, who states in his book *The Last 100 Days* that "The mission to Hammelburg was a complete failure. . ." The mission failed only from the standpoint of returning with the prisoners. All in all, a great deal had been accomplished by a very small force of heroic, dedicated men who, like their Army commander, used audacity to accomplish an extremely difficult task.

Anyone wishing to review the author's bibliography and footnotes may do so by writing to ARMOR. Ed.



LTC FREDERICK E. OLDINSKY received a direct commission in Korea in 1953 while serving as a tank commander in the 9th Infantry Regiment. He has commanded several tank companies, instructed at the U.S. Army Armor School, and served as S-3 and XO in the 2-34th Armor in Vietnam. A CGSC graduate, Colonel Oldinsky also served with MASSTER and the XM-7 program, and is currently pursuing a master's degree at Trinity University in San Antonio, TX.



Physical Readiness for Everyone

by Captain Thomas L. White

That physical readiness is a critically important quality in soldiers is not a subject for debate. It is fact. The rationale to support that premise can be extracted from a wealth of historical material and is liberally documented in a number of official U.S. Army publications. Having accepted the basic merit of the subject, the remaining question is essentially twofold. First, what type of program is necessary to establish physical readiness and second, how should that quality be tested?

The contention advanced here is that the former area of interest, physical fitness programs, is well in hand while the latter issue is sadly lacking. Great strides have been made in recent years to develop physical fitness activities that are both innovative and challenging. The well publicized combat football program is a prime example of the positive effect that physical fitness can have on a unit. In contrast to this, the testing side of the coin is still in the dark ages. It is the purpose of this article to examine the current testing program in regard to the following issues:

- Who should be tested?
- What tests?
- How should the tests be administered?

Within each area the deficiencies of the current program and a recommended solution are offered.

Who should be tested?

The answer to the above question is simple — everybody. Perhaps a bit of elaboration is necessary to settle the issue. The current program excludes personnel over 40 years of age from any mandatory physical testing requirements. No evidence can be found to support 40 as the golden age of inactivity. On the contrary, consider the following policy statement:

"There is no reason why persons over 40 should not maintain a degree of fitness commensurate with their age." (FM 21-20)

If our older soldiers (as opposed to "old soldiers") are expected to be physically fit as the policy statement seems to indicate, they should be made to *prove* it along with everyone else.

The other side of the age question has to do with the link between physical fitness and battlefield performance. Success in combat is predicated on physical readiness. It is highly doubtful that our future enemies will be so considerate as to not shoot anyone over 40. The cornerstone of successful command is leadership by example, which in this context means that all leaders, regardless of age, must be able to endure the same physical rigors that confront their younger troopers. The readiness of each soldier, young and old, to meet this challenge must be tested.

As a final point in the age issue, it is recognized that there are many older soldiers who presently take physical fitness tests on a voluntary basis. They are invariably our best leaders. This does not obviate the need to formalize the re-

quirement. To paraphrase General Bruce Clarke, "It's not the outstanding leader that training programs must account for, but the problem of making the substandard ones adequate." Without a formalized, enforced requirement a great many of the senior troopers of the Army will continue to dodge the fitness issue. The recommendation here is that every soldier in the U.S. Army, regardless of age or rank, be required to demonstrate his physical fitness on a periodic basis.

What tests?

The current physical fitness testing program is predicated on the notion that physical readiness requirements are related to job description. This philosophy dictates, for example, that fitness standards for infantrymen be significantly higher than those required of clerks. This policy has given rise to a testing program that includes different examinations for a number of generic job descriptions. A grand total of seven different tests are found in the current test program, outlined in the following table:

CURRENT PHYSICAL FITNESS (PF) TEST PROGRAM

BASIC PROGRAM TEST	PARTICIPANTS
Basic PF Test (BPFT)	Basic Combat and Medical Basic Trainees
Advanced PF Test (APFT)	Combat Support, Advanced Individual Training, Combat Support Trainees
Staff and Specialist PF Test (SSPFT)	Combat Service Support Units, Tables of Distribution and Allowances Units, Students
Minimum PF Test (MPFT)	Over 40 (Voluntary)
SPECIAL TESTS	PARTICIPANTS
Inclement Weather/Limited Facility PF Test	As Necessary
Airborne Trainee PF Qualification Test	Airborne Trainees
Ranger/Special Forces PF Qualification Test	Ranger/Special Forces Trainees

The last three tests reflect the justifiable need to test under unusual conditions caused by either weather, facilities, or particularly demanding duties. The problem in this area lies in the rationale supporting the tests described in the Basic Program.

This array of tests has given rise to a whole host of what I call "second class" soldiers. The troopers on the first team take the APFT, a rigorous, demanding test of strength and stamina. The second string takes the other tests which range in difficulty from the BPFT, which is only a cut below the APFT, to the SSPFT and MPFT, both categorized as a joke. As an example, one can easily amass the minimum required total point score in the first four events of the SSPFT, then walk the mile, as no minimum standards are established in any single exercise. Clearly this needs to be fixed.

The rationale which supports the Basic PF Program; that some soldiers need be more fit than others, is specious for several reasons. It's quite easy to cite historical examples of support troops who were required to accomplish combat missions. In fact, our Vietnam experience proved this point on numerous occasions. So there appears to be no grounds to lower physical fitness standards on the basis of primary duty assignment. In addition, experience again shows that second class standards in any area of interest invariably pro-



duces second class units. Physical fitness has a direct bearing on unit pride and morale. It's difficult to generate a great deal of pride when the unit walks the mile while the commander and the sergeant major hold the stop watches (they're probably over 40!).

The fix to the test selection dilemma is quite simple. All soldiers, young or old, should take the APFT on a periodic basis. The revised testing program would include the APFT and the current Special Test Program, which would continue to be administered on an "as required" basis. The current APFT scoring system could easily be extended to include troopers over 40. (See table below.)

APFT SCORING SYSTEM

EVENT	POINTS	17-25	26-30	31-35	36-40	41-45	46-50	Over 50
INVERTED CRAWL (scored in seconds over 40 meters)	100	14	15	16	17	19	25	30
	60	25	27	28	29	31	37	42
RUN, DODGE, JUMP (scored in seconds)	100	19.5	20	20.5	21	24	28	32
	60	24.5	25	25.5	26	29	33	37
HORIZONTAL LADDER (No. of rungs in one minute)	100	83	80	75	69	55	45	35
	60	36	32	27	21	17	13	10
BENT LEG SIT UPS (No. in one minute)	100	54	53	52	51	45	40	35
	60	32	31	30	29	23	18	13
TWO MILE RUN (time elapsed in minutes and seconds)	100	14:00	14:10	14:24	14:34	14:44	15:01	15:31
	60	14:09	14:23	14:33	14:43	15:00	15:30	16:00
	60	18:58	19:08	19:18	19:28	19:38	19:55	20:26
		19:07	19:17	19:27	19:37	19:54	20:25	20:56

Only maximum and minimum scoring levels have been provided. These are the same as current APFT standards through age 39. I have merely extended the table to include all ages. Minimum requirements are 60 points in each event. Failure to meet any event minimum constitutes failure of the entire test.



The end product of this proposal would be a testing program, uniformly administered with the same standards to all soldiers from the Chief of Staff to basic trainees. The proposed testing program would be truly challenging and a source of unit pride — to all units.

Test Administration

Test administration includes three subareas: actual conduct of the test, reporting of test results, and recognition of both unit and individual performance. Current physical readiness test administration, while varying widely from unit to unit, reports test scores on an individual basis only. There is no formal unit recognition of physical readiness on an Army-wide basis, nor will you ever find physical readiness reported through any of our formal evaluation processes (Annual General Inspection, Enlisted Evaluation Report, or Officer Evaluation Report). In short, the current administration system is nonexistent in any real sense and consequently, so is physical readiness.

Unit readiness, and all that catch-all phrase entails, is checked formally during the Annual General Inspection (AGI). The results of the AGI are normally given "do or die" priority by commanders and they train and prepare accordingly. Needless to say, if an area of interest is not on the AGI schedule, it will not assume great priority in the eyes of the unit commander. It stands to reason then, that if physical readiness is as important to the Army as we all claim it is, it should be made a formal matter of IG interest.

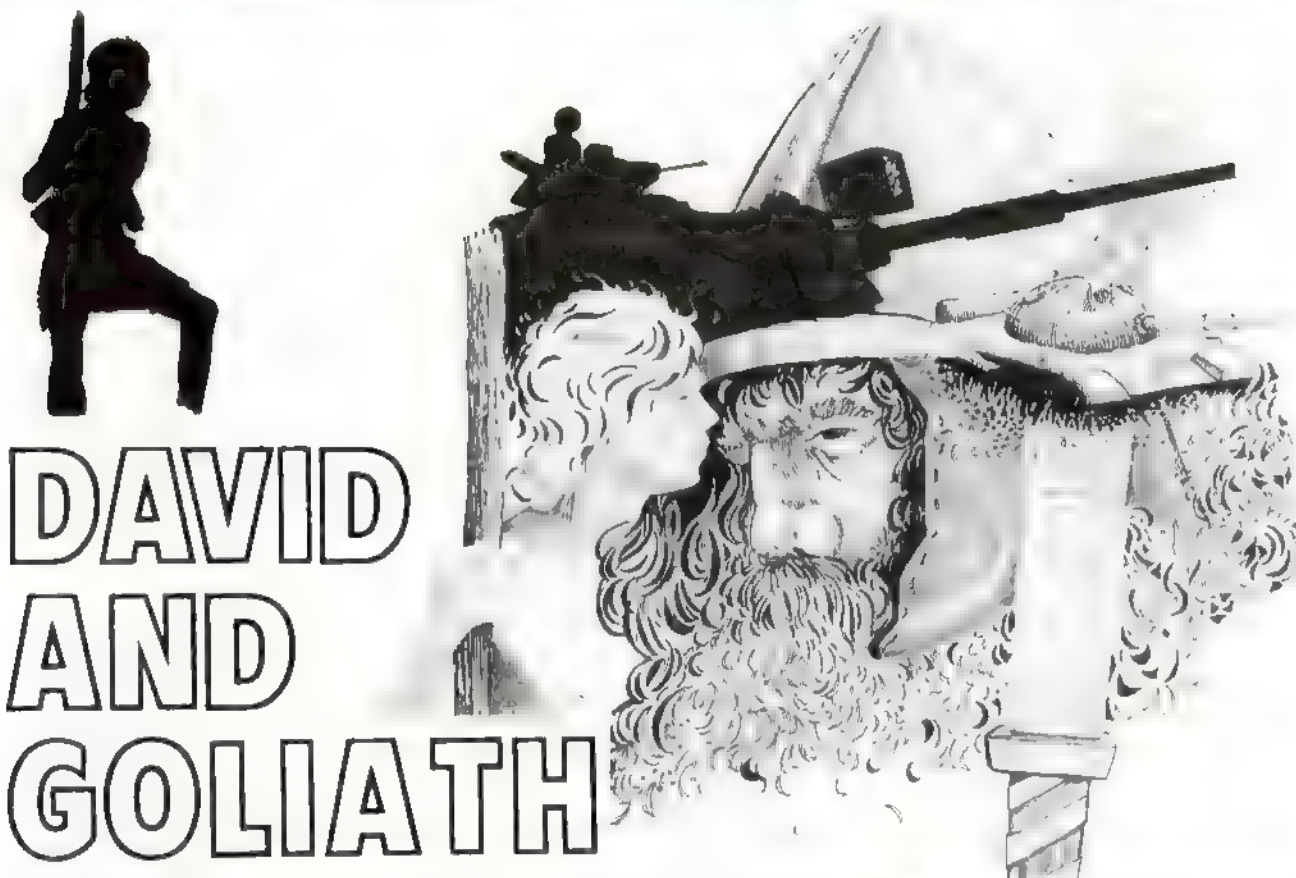
I propose that units would continue to internally administer the AFPT on a semi-annual basis. The results of these tests would be maintained on an individual basis and reported on a *unit* basis in much the same manner that materiel readiness is currently reported. During the AGI, a group of randomly selected personnel from the inspected unit would take the APFT and be scored by IG personnel. If, say, less than 70 percent met minimum standards the unit would be rated unsatisfactory in physical readiness. Also, if the tested individuals' scores varied greatly from those achieved during internal unit testing, the unit could be cited for fudging its records. The point is until physical readiness is given equal billing with other unit performance areas, it will never receive the priority it deserves.

On an individual basis, rewards should be established for extraordinary physical readiness in either direction. Current physical fitness test scores should be typed on the individual's EER/OER when he is rated (standard practice in the Marine Corps). Soldiers found unsatisfactory in physical readiness should undergo remedial training and repeated retesting until they measure up or out. On the positive side, I propose a Physical Readiness Qualification Badge which would be awarded on much the same basis as the current Marksmanship Badge. Soldiers scoring in the top 10 percent would receive a gold badge while all other troopers meeting minimum standards would receive a silver version of the same award. The badges would be good until the next periodic test and would become a distinctive symbol of excellence in physical readiness.

To summarize the proposals in my revised physical fitness testing program I would test all soldiers, using the same examination, on a periodic basis. I would recognize all individuals' performance by formally reporting the results through the EER/OER system and awarding badges for demonstrated excellence. Finally, I would report physical readiness on a unit basis and check the validity of that rating during the AGI. The implementation of this test system would force all units, weak or strong, to vigorously participate in the excellent physical fitness programs that currently exist. The payoff to the Army would be a considerable boost in physical readiness. The payoff to the trooper would be measured by his improved health and general welfare. After all, physical fitness is, in essence, the most absolute form of life insurance.



CPT THOMAS E. WHITE was commissioned in Armor upon graduation from the United States Military Academy in 1967. A graduate of AOAC and Rotary Wing Flight School, he has served as platoon leader in several cavalry and armor units in CONUS and Vietnam and later as troop commander, operations officer and S-1. Captain White is currently serving as a systems analyst with the Materiel Systems Division, Directorate of Combat Developments, USAARMC.



DAVID AND GOLIATH

The "How to Fight" team at Fort Knox, in conjunction with similar groups at TRADOC, Fort Leavenworth, and all the other service schools, has been struggling for almost 18 months to communicate ideas to the Army. We have used training circulars, draft field manuals, TV tapes, personal visits, the telephone, the Armor Association, and the pages of *ARMOR*. These ideas have been wargamed, studied, field tested, and are now being taught. After reading the letter of Staff Sergeant Bunce (First Battle of the Next War), and the thoughts of Lieutenant Jordan (Spirit of the Bayonet), both in the March-April 1976 issue, it is obvious that some good men still need some good answers, lest they continue to believe that the Armor School is preparing men to fight on a battlefield different from the one on which they plan to fight.

The following is the introduction to an update briefing on defense being prepared for presentation to Fort Knox visitors, and may contain the answers they seek.

In the first battles of the next war, U.S. forces will be outnumbered. The U.S. Army intends to win the next war. From these two statements stems the entire body of revised tactical doctrine now being enunciated in training literature.

Through a continuing inability to overcome old tactical concepts, old ideas, and the resistance of a substantial number of soldiers who say, in effect, "but we've never done it that way before," and through the continuing inability to perfectly describe the application of principles laid down by General DePuy, Lieutenant General Starry and others, the

Army at large is confused, resentful and unsure of what the "new doctrine" is.

To begin with, the Threat is a large, modern, well equipped armed force, trained to fight in the way large armies fight. It focuses on *Offense* and *Mass*, and intends to overpower and smash any force in its path. To do this, they attack with masses of tanks and mounted infantry, supported by hundreds of artillery pieces including rockets and mortars, hundreds of first line tactical aircraft, and a logistical tail whose size, until recently, was not appreciated by Western armies. This force attacks in a succession of strong echelons, moving swiftly along lines of least resistance, depending upon speed for flank security, and if faced with a determined line of strongpoints, masses forces on a very narrow front to overpower and break through to the rear. This massing can be as much as two divisions on a front of 10 to 14 kilometers. Behind these two divisions will be another two divisions, ready to exploit the breakthrough, day and night, deep into the rear areas.

The problem, then, is to defeat the masses of tanks, BMP's, artillery, and aircraft in that first echelon and in every succeeding echelon, for as long as it takes to convince the Threat force commander that his attack is unprofitable. Now, much has been said and written in criticism of the idea of "winning the first battle" and of preserving the force. What some critics have ignored is the context in which this idea has been presented. "Win the first battle" means that we believe we will *not* have the traditional opportunity to

lose battles for 6 months or a year while we and our allies tool up our training centers and industries to field large armies which *ultimately* overwhelm the Threat armies, winning the last battles and the war. The idea of "win the first battle," and the second, and third, and so on, is simply the obvious conclusion that we must defeat the enemy early, probably often, and not look over our shoulders for new men and equipment. There will not be any. Preservation of the force is another obvious conclusion from the most cursory examination of force ratios. If outnumbered on the order of 5 to 1, we cannot afford to spend one to destroy one, or two or four, or in the end we will lose. Every U.S. tank, TOW, artillery tube and aircraft must destroy one of the enemy and then another and another until the exchange ratio exceeds the force ratio. So the idea is not preservation for preservation's sake, but rather preservation for as long as possible *while taking out the enemy in large numbers*. Few thinkers close to the problem hold any notions that troops initially at the point of the spear will survive the war. The message is that while dying for one's country is still an honorable pastime, dying for one's country without first having killed six, eight or ten of the enemy will be a futile gesture

With this background of the problem, and the driving requirements to win early and often, it follows that the U.S. Army must overcome its "big army" past and learn to operate in ways that permit a small force to defeat a large one. History is full of examples of this kind of result, starting with David and Goliath and culminating in the most recent (October 1973) struggles in the Middle East. That mass is not necessarily the ultimate principle is an idea held by great captains and military writers for years. Marshall Saxe said: "It is not big armies that win battles; it is good ones." B.H. Liddell Hart wrote: "The cult of numbers is the supreme fallacy of modern warfare." And the idea of overall numerical inferiority is implicit in the words of Admiral Mahan: "The fundamental object in all military combinations is to gain local superiority by concentration."

Local superiority, or at least locally satisfactory force ratios, by concentration of forces and fires at the critical point on the battlefield, is the object of the U.S. Army's ACTIVE defense

David L. Tamminen
Lieutenant Colonel, Armor
"How to Fight" Team



Airspace Management

One of the first things some commanders worry about when the use of helicopter units is suggested is Airspace Management! Forget it—it's a holdover from bygone days in Army Aviation. It's been overtaken by the modern battlefield and the obsolescence of fixed-wing aircraft in the Army's tactical inventory. The fact is, I don't know what we're going to do with all the ATC folks when the bullets begin to fly. We do, indeed, need them for peacetime interface with civilian aviation; but couldn't this be one of those functions the Army could legitimately "civilianize" since there is a minimal wartime Army requirement? Take note that I said Army requirement! Certainly, our sister services continue to generate a requirement for control of their air traffic, but we must face the fact that in the tactical area of operations, we're not going to penetrate their airspace anymore. If we do, we won't survive. Terrain flight will govern Army tactical aircraft. If the situation arises that an Army aircraft, say a U-21 or UH-1, must mix with the boys in blue, we can simply give them a call. Control of the airways rightfully belongs to the Air Force.

Now before anyone cries "bunk," let's look at this subject in a little more detail. First, we'll take the tactical battle area from the brigade's rear boundry forward. We simply don't need an additional agency to coordinate the use of Army aircraft in this area. Consider the point that the majority of these aircraft will be organic to air cavalry and attack helicopter units, and will be integrated into the tactical scheme of maneuver as a maneuver unit. There is a fire sup-

port element at brigade and battalion levels which coordinates the artillery, a Tactical Air Control Party (TACP) from the Air Force which coordinates Air Force sorties, and a unit operations section which coordinates the employment of maneuver units and these supporting fires. These folks, who all work under the guidance and direction of one man, the unit commander, coordinate everything that goes on in the unit battle area. Each unit subordinate to this commander, including aviation units, is involved in a coordinated scheme of maneuver. Aviation units can, and should, be treated as other maneuver units; no special procedures are required. I hear someone saying, "How do you get artillery and airstrikes on the targets?" Simple, you just fire away. That's not meant to be facetious, but there are many who will take it as a joke. In fact, it's as simple as it sounds. Air cavalry, attack helicopters, and other aviation units will deal with the coordination of artillery and airstrikes much as any other combat maneuver unit. The responsibilities for not running into an artillery round are much the same as for an armor unit, except the aviation unit gives some thought to the trajectory of the round—not much—considering the altitudes of Army aircraft that are dictated by the weaponry of the modern battlefield

What's that? How do we avoid the bombs and "fastmovers"? Once again the aviation unit will deal with the airstrike just as a ground unit does—stay the hell out of the way! The fear of a midair collision between Army and Air Force aircraft has been reduced to a large degree by the

battlefield environment which dictates terrain flight for Army aircraft. The possibility of a midair collision is still there. However, it can be all but eliminated by the rather simple solution of establishing a minimum altitude for Air Force aircraft and a maximum for Army aircraft, with a buffer in between. For airstrikes, the Air Force aircraft will, indeed, penetrate the Army airspace, but this will be coordinated ahead of time—in fact, it only takes a few seconds to get clear once notice is given. If an Army aircraft must penetrate the Air Force airspace, it'll require a call to get clearance either through the TACP or other appropriate Air Force agency. In effect, what will exist is layered airspace. But keep in mind, the ground commander owns it all and coordinates its use. This layering is an added measure for the aviator's peace of mind and safety. I see the airspace management problem, if indeed it is a problem, being solved in a similar manner from the brigade rear boundary further back. The potential for interface of Army and Air Force aircraft will certainly grow the further to the rear one progresses. Perhaps a requirement will continue to exist for some sophisticated type of air traffic control at corps level, or even division level. However, if the corps headquarters is indeed a tactical headquarters, as envisioned by at least one corps commander I know, it'll be a minimum requirement.

Have you ever seen one of those maps with a grid system superimposed over the existing arrangement? Each aviator is issued one of these as a tool of airspace management. Each grid is marked with a coded designation for reporting purposes. Aircraft or groups of aircraft must report their whereabouts to an agency set up to monitor this information. My question is *why*? How do we keep up with tanks? The reporting requirements vary from every 15 minutes to each hour. This system for aircraft, in my judgment, is a waste of time and energy. Someone already owns these aircraft for tactical purposes, whether it's for combat, combat support, or combat service support. An SOP for one unit on REFORGER 75 stated that these position reports were paramount and even took precedence over tactical play.

Realistic training you say! There were also plans, or at least discussions, during REFORGER for setting up instrumented airfields at *brigade level*. It appears that the folks who propose that Army aircraft fly instruments in the brigade area of operations think these aircraft will be invisible to the enemy radar directed weapons. It must be clearly understood by each of us that if we cannot move about the battlefield near the FEBA using terrain flight, then we're going to ride a ground vehicle or walk. Before the retort about being out of range is raised, consider the benefit the enemy will gain by seeing blips on his radar consistently disappearing at or near a particular set of coordinates. Instrumented flight requires altitudes which are unacceptable, in my judgment, as far back as division. I can also make pretty good case for corps.

No doubt this article will be controversial and that's good! If I can generate some serious study of this subject, it's been worth the time and potential barbs. The requirement for some means to control Army aircraft certainly exists. I, for one, think it's a unit problem and does not require sophisticated solutions.

My message is this: Army aircraft, for the most part, are tactical vehicles which will operate in the same environment as ground vehicles as part of a unit. Their mobility and speed do provide a marked advantage over ground vehicles. Beyond that point, Army aviation units do not and should not require special control measures. In order to be fully effective, these units must adapt in every way possible to facilitate integration into the overall scheme of maneuver. We who are in the business of Army aviation simply must recognize the fact that we've entered into a truly tactical environment and some of the sophistication we've inherited and have used in the past no longer has tactical application.

JOSEPH C. GROSS, III

Major, Armor
Attack Helicopter Branch, USAARMS

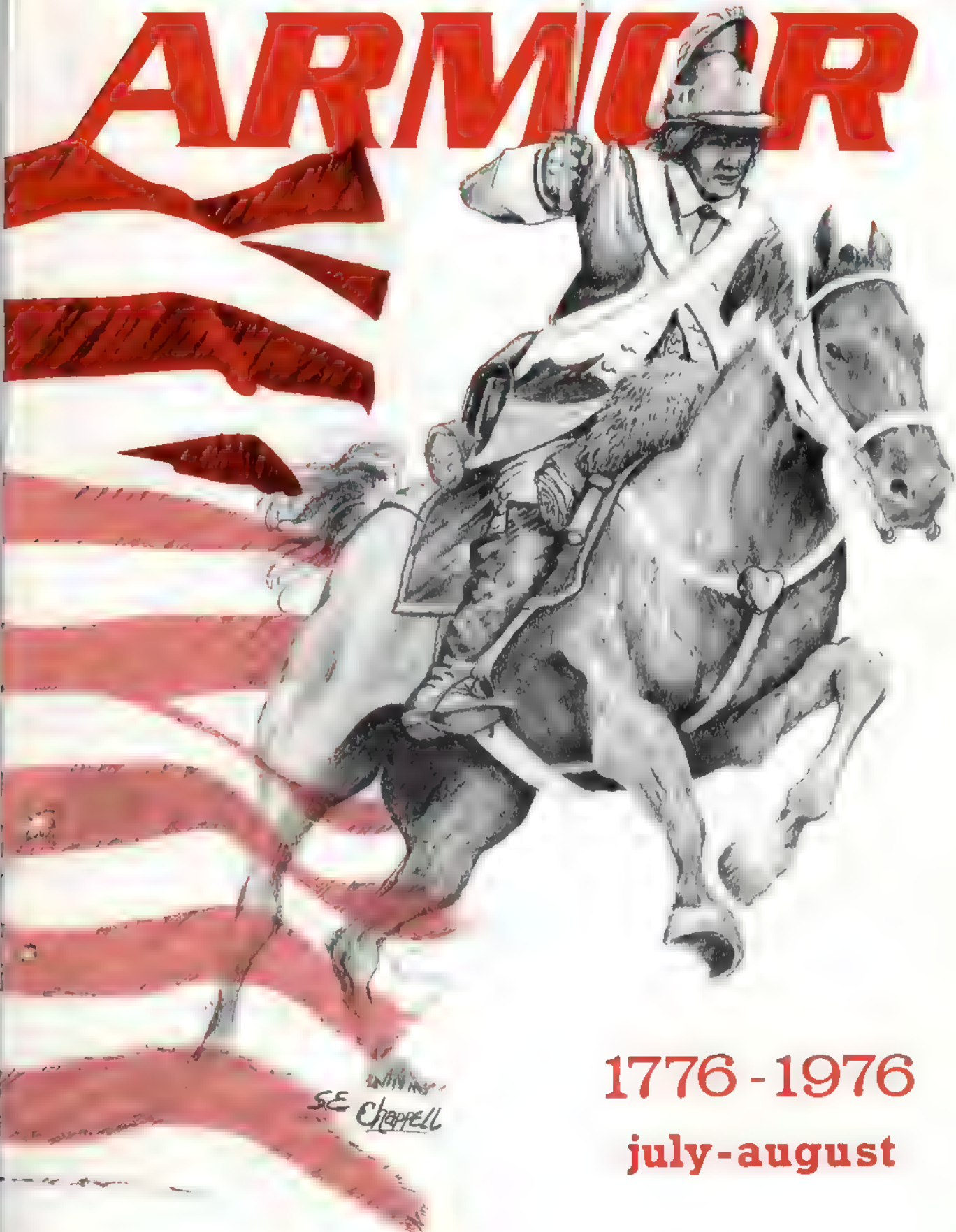
D Troop May Be Missing

At the risk of beating a redlined helicopter to death, I am compelled to enter into the D Troop controversy that has been raging since General Bartley raised the specter of the myth that D Troop belongs to the Cavalry Squadron. The plain truth is that there are very few advocates of the air cavalry troop where it counts—out in the corps and divisions.

The approved doctrine and the pertinent field manuals are all there, but the fact remains that I have just spent 2 years as a squadron commander fighting a defensive action to hold onto my D Troop. Lest anyone think that my case is isolated, I would point out that two of the divisions in USAREUR do not even have the D Troop colocated with their parent squadrons. You can make excuses about stationing, but you have to admit that separation does not foster the integration and mutual familiarity that is required for successful air/ground cavalry operations. If there is no myth, you would think that the stationing problem would have become serious enough to solve!

Let's look at the aviation assets first. I was able to fight clear of mission tasking for my aircraft because I had a sympathetic chain of command composed of more cavalrymen than is common, but I still paid a price. Two of my light observation helicopters (LOH) were on "hand receipt" to various elements of the division, and three of my utility helicopters (UH) had been absorbed by still other division base elements. Right away you can see that there is some problem in convincing even the most sympathetic audience of the sharp difference between the *aviation assets* of the

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"To disseminate knowledge of the military arts and sciences, with special attention to mobility in ground warfare; to promote professional improvement of the Armor Community; and to preserve and foster the spirit, the traditions and the solidarity of Armor in the Army of the United States."

ARMOR'S HERITAGE

The United States Dragoons

Their spirit and dash carries on in 1976.

I thought for some time about the cover design for the July-August 1976 issue. I think our own Art Director has come up with the appropriate theme.

It does not matter whether you are an old horse cavalryman, young or old tanker, armored cavalryman, or air cavalryman, our heritage is clear. It all started for us in today's Armor with a few mounted dragoons assigned to monumental tasks.

We have come a long way since December 1776. We were there in one formation or another for every good scrap in which our growing nation was involved. We even made the Boxer Rebellion in China during 1900. We evolved as a service as the need arose. There were some very lean years along the way. The equipment and weapons changed over the decades, but the kind of man the mounted combat arm attracted did not and has not changed today. Besides all of the qualities desired in a good American soldier, the mounted soldier is flexible, adaptable, understands his mission and accomplishes it in short order; but most of all, he shows himself, whether general or private, to be resourceful and innovative; sometimes beyond belief.

In the past 3 years, I have spent many hours reviewing the file of our journals back to its beginning in 1888. The story of the evolution of the Cavalry service, now Armor, is all tied in. It is a story of duty, heartbreak, and glory; a fight for funds and name calling as the horse-shoe gave way to the track shoe. Armor philosophy continues to evolve with the advent of the rotor blade.

Now in 1976, in its many dimensions, Armor Branch is a culmination of what we have learned after two centuries. Each aspect has a part to play. We are in this business together — all Armor.

Today when we speak of combined arms, what better depicts this than the tri-colored triangular patch of Armor. It all started in 1776 with some mounted riflemen called dragoons, a few artillery pieces, and a mission. We have come a long way in 200 years; ours is a proud heritage.



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"A Case for 'Little Joe'"

Dear Sir

Captain James D. Brown's article in the November-December issue on auxiliary generators describes the situation of a tank unit operating in a cold climate without auxiliary generators—uneasy, at best. I'd like to offer the following comments based upon experience.

The "Little Joe" in the *M-4* was invaluable, but messy, a maintenance headache, and could be very noisy. Captain Brown's noise signature problem will not necessarily be solved by merely having an auxiliary generator—unless it is designed to minimize noise.

An auxiliary generator can be designed with such an excessively large electrical power generation requirement that it can be even more difficult to start than the main engine. Seems to me, this was a problem in the *M-41*. Or was it the *M-47* or both?

The suggestion that the exhaust gas be discharged directly into the engine compartment is not a good idea! These fumes carry all kinds of undesirable constituents, including carbon residues, oil particles, etc., plus water from both the intake air and as a product of combustion. Using the heat content of the exhaust gases to warm the batteries and/or engine is desirable, and can be accomplished with a simple heat exchanger. The gases should be vented to the exterior after passing through the heat exchanger in the engine compartment. One asset of using the heat exchanger is that it will decrease the noise level of the exhaust.

Captain Brown's suggestion that the personnel heater be redesigned to provide some sort of battery boost appears to have merit. I am prejudiced this way since all tank crew compartment heaters I have had experience with were too unreliable, anyway. We never used the ones in our *M-46*'s in Korea (1954-1955)—they were missing, not working, or too flaky to operate.

It shouldn't be beyond our capacity to design a compact "Little Joe" that will provide the kind of standby power and heat output described by Captain Brown. That is, unless someone hangs on the generator the electrical requirements of an aircraft carrier—which will probably happen.

What does the tank unit in the field do in the meantime? There are two partial solutions: crew maintenance, and field expedients.

- Crew maintenance. Tank batteries and all electrical connections should be maintained in spotless condition, and batteries must be charged and at proper electrolyte

level at all times. This is as important a supervisory responsibility as insisting upon topping-off fuel tanks, etc.

- Field Expedients. As usual, this can't be handled as an abstraction, since the solution arises as a result of experiencing the problem of operating tanks without auxiliary generators.

D. J. LOUGHLIN
Huntington Beach, CA 92646

"A Look Down the Pike"

Dear Sir,

I have read your editorial, "A Look Down the Pike," in the January-February issue of *ARMOR* with great interest, since I happen to be an armored vehicle enthusiast. Although I am far from being an expert on tank design, I have always felt that we have not put our technological know-how to good use in the design and development of tanks and armored vehicles in general.

Our present *M-60*-series, though one of the best, could still have been much better with a little more effort on the designer's part. In my opinion, the *M-60* is much too high in silhouette, making it an easy target, much too heavy in weight, restricting its agility, and undergunned for its size. First, a lower silhouette would be most desirable though there would be some disadvantage, such as more cramped crew space, which would be offset with greater survivability. Second, the weight of the *M-60*, over 50 tons, is in reality unnecessary, since its speed and agility is impaired without giving the crew superior protection. The weapons of today are capable of making any tank vulnerable; therefore, a lighter MBT of around 40-45 tons would give its crew sufficient protection without sacrifice of mobility. Third, we are, I believe, the only major country in the world unable to produce a tank gun of domestic origin. This to me is a sorry state of affairs, since we boast of our superior know-how and technological advances. I find it inconceivable that we cannot design and produce a tank gun of our own. Maybe we should send some of our experts to Britain to gain knowledge in this field, since the British have the ability to design excellent guns. For its size, the *M-60* is undergunned, since the Russians seem to be capable of fitting a 122-mm smoothbore gun in their newest MBT, *T-70*. In my opinion, a gun of no less than 120-mm should be fitted in all future MBT's. We seem to be obsessed with producing elephants armed with pea shooters. I am in agreement with your contention that we

sorely need a new light tank to complement the MBT. From what I have read, the *M-551* is not the solution, and is, in fact, a piece of junk. You mention that the *T-92* may have been a step in the right direction. This is a tank with which I am not familiar, since I do not recall reading any article on this vehicle in past issues of *ARMOR* Magazine. I would greatly appreciate it if you can furnish me with some details along with pictures of this tank, since you have aroused my curiosity.

In conclusion, I just hope that one future MBT, the *XM-1* project now in the development stage, does not become a white elephant, and that we have learned from our past mistakes. We cannot afford more mistakes in the art of tank design. Thank you.

JOSEPH L. MANTA
Northvale, NJ 07647

The Search For "Hot Shots"

Dear Sir

In reference to the article by Lieutenant Colonel Bahnsen on "Gaining the Edge" (January-February 1976) and the search for "Hot Shots," the *I-70* Armor at Fort Carson implemented such a program, and can bear witness to the problems Colonel Bahnsen describes.

With final qualification scheduled for April, the battalion S-3 section, with advice from the Army Research Institute at Fort Knox, tested 11E's for visual acuity, color blindness, hand-eye coordination, and ranging. They also screened personnel records for GT scores. The tabulated data was forwarded to the individual company commanders with appropriate recommendations.

The companies assembled their crews on this basis as much as possible. In general, the best qualified 11E's were placed in the key positions of gunner and tank commander. Several of the senior NCO's did not score as well, but were left in their hatches because of their experience and leadership. However, attention was brought to their shortcomings and was useful in directing their practice.

As predicted by Lieutenant Colonel Bahnsen, our selection process has been degraded by levies, administrative losses, and school quotas. We will be fortunate if 50 percent of the selected crews remain intact to fire tank Table VIII. The training emphasis placed on those gunners, tank commanders, and crews has been or will be lost.

Lieutenant Colonel Bahnsen's article has

painted an accurate picture indeed. Our practical experience has shown that no matter how much testing and selection is applied, without an appropriate personnel system to back it up, we will never have the "Hot Shot" crews we so desperately need.

V PAUL BAERMAN
Captain, Armor

Fort Carson, CO 80913

Antiarmor Vehicle Discussed

Dear Sir:

It was heartwarming to see the cover of your January-February issue. At last the idea of an *M-113* elevated *TOW* missile launcher is gaining momentum. An idea that has had to fight for survival for most of 10 years is finally being given serious discussion and solid support.

Captain O'Neill deserves special praise for fighting for this idea when few others would, and for his insight concerning its utilization which is innovative and thought-provoking. Unfortunately, Captain O'Neill's misunderstanding of an earlier test effort is not so unique and deserves an explanation. Captain O'Neill criticized a vehicle tested at MASSTER because it was bulky, unarmored, difficult to camouflage, etc. Criticism that would have been warranted if the system was a preproduction prototype, however, the vehicle was what is called a test rig.

Your readers might be interested in a short history of the stormy evolution of the elevated launcher concept. In 1967, the Advanced Concepts Laboratory at the U.S. Army Tank-Automotive Command, behind the creative guidance of Mr. Clifford Bradley, began what was to be a long and arduous task of trying to sell a conceptual idea (*sic*). Support was almost impossible to come by in spite of several attractive preliminary designs and very promising combat simulation studies. Although this combat vehicle concept offered for the first time a capability to fight tanks from behind cover, inexpensively and with relative immunity, it was regarded as a threat to other developmental systems. Deaf ears were turned time and time again.

Finally, in desperation, we attempted to dramatize our idea with some hardware. With almost no outside support, and a laboratory budget that could barely meet the payroll, we set out putting items together from the salvage yard. The primary piece of free equipment was a 10-foot folding periscope developed previously as a reconnaissance experiment. Ninety-five percent of all parts were chosen not to optimize the design, but because they were available in some parts bin or because someone didn't have it nailed down. Ungainly as it looked, we hoped that someone would appreciate that idea and realize that if we could hit

targets by launching missiles from 10 feet above an *M-113*, anything lower than that, on a properly designed system, would be low risk indeed.

Fire it did, accurately hitting all moving targets, more a commendation of the *TOW* missile than its jury-rigged launcher. After passing the firing tests, MASSTER tested it in field exercises, recognized the value of the idea behind the test rig, and recommended that it be pursued. The idea was still resisted vehemently in some quarters and might have been killed if Soviet armored missile launchers had not graced the desert in combat in 1973.

An orderly development it was not, but revolutionary ideas seldom have been.

PHILIP J. MURPHY
Project Engineer, USATACOM
Warren, MI 48090

Misconception

Dear Sir:

Page 11 of the January-February issue contains a statement which may mislead the uninitiated. The *M-60A1E1 (E2) (M-60A2)* tank was originally conceived in 1964 as a means of quickly adding the capabilities of the *Shillelagh* missile system, then being designed into the *M-551 ARAAV* as a complementary system to the conventional gun. In its original concept, the *E2* tank was to make use of the proven *M-60* tank chassis as a platform for the 152-mm *XM-162* gun/launcher which would be mounted in a new design compact turret. By 1969, 300 complete *E2* tanks and 243 additional turrets, without chassis, were in storage because of test failures. The pressing argument in favor of the *E2* was that it would add missile firing capabilities to armor units well in advance of *MBT-70* fielding in the early 1970's. When the *USIFRG MBT-70* program was aborted, the *MBT-70* missile firing tank development was continued as the *XM-803*. Work to find the fix for the *M-60A2* test failures continued. The *XM-803* died in December 1971. But the decision to fix and field the *M-60A2*, over protest of most of the armor community, was made two months prior, October 1971. The decision was prior to and independent of the Congressional termination of the *XM-803* program.

MARK F. FALKOVICH
GS-13, Equip Specialist
Fort Knox, KY 40121

"A Mechanic's Opinion"

Dear Sir:

In your January-February issue, you had a letter by Sergeant James F. Leone. I have to disagree with him in part. In the first place, he states that he looked over the magazine. That's his first problem; he should have

read it. Myself and several others I know read it from cover to cover. The magazine is well written and the individual articles are informative and look ahead to the future, as well as what has to be done now. For example, I particularly enjoyed Lieutenant Colonel Bahnsen's article, "Gaining the Edge." In the past we used to look at a tank and say, "That's our tank and it has a 4-man crew." Not anymore. The tank is part of a team and the team has 5 components—a driver, loader, gunner, tank commander, and the tank. By working together as a whole unit, they can effectively accomplish their assigned mission.

Getting back to Sergeant Leone's letter, he also states he has 5 years experience as a track mechanic. If this is true, then why doesn't he use The Army Maintenance Management System's Bible, namely TM 38-750. I feel he could utilize his time more effectively by filling out DA Form 2407 which is used for submitting Equipment Improvement Recommendations (EIR) than by writing to *ARMOR* Magazine and calling everything a piece of junk.

He also states, "A War is a WAR, anyway we look at it." I for one would rather be traveling across a field in a well maintained track vehicle instead of stalled in the middle of a field cussing out a supposed piece of junk.

This has always been the American way of life—if only we had this or that. Well we don't, so we use what we have to the best of its ability and keep it running to the best of our ability. Eventually something better will come along. Until then, keep them (*sic*) tracks rolling!

ROY J. CLAVERING
Sergeant First Class
Port Orchard, WA 98366

Dear Sir:

In your January-February 1976 issue, you printed a letter by Sergeant James F. Leone from Port Orchard, Washington. He had only bad comments about the *M-551 Sheridan*. Being a former *M-551* crewman for 2 years, I must disagree with his "mechanic's" opinion.

I started as a PV1 driving a *Sheridan* in B-1/3 ACR, Fort Bliss, Texas. I progressed from this position/rank to SP4 and was mostly a driver, due to lack of EM. My *Sheridan* was very seldom deadlined the entire time I was on it. Sure, I had to take the initiative to work occasionally when other people were off, but my platoon leader, 2LT Charles Berlin, made it all worthwhile as long as my track was in operating condition.

I'll go back to *Sheridans* anytime.

ERNEST H. WILLYARD
Sergeant, 64th Armor
APO, NY 09702



THE COMMANDER'S HATCH

MG JOHN W. McENERY
Commandant
U.S. Army Armor School

OUR NEW LIGHT TANK

The attack helicopter has been called many things, but not often a light tank. I use the term "light tank" because of the many similarities between attack helicopters and tanks, and the agility and mobility of the helicopter. Most understand the horizontal mobility that a helicopter has and how attack helicopters can influence the action on one flank of a division now, and then a short time later can do so on the other flank of the division—unhampered by cross-compartments, streams, traffic, or other obstacles to ground maneuver. Not so universally recognized is the vertical mobility of the helicopter and its capability to be able to get into a firing position much more frequently than ground elements. By this I mean, solely by raising itself a few feet in the air, a helicopter can fire from a position a ground vehicle cannot. The helicopter can fire from the top or side of any wooded ridge, while the tank cannot unless there happens to be a clearing in that spot and a means of getting there. This is often not the case.

Is an attack helicopter unit a maneuver unit? In Vietnam we used the attack helicopter both as a fire support means in gunship units and as a maneuver element in air cavalry units. In the air cavalry role, there wasn't much question because the air cavalry unit was a combined-arms team with

its scouts and infantry, and because often it was given an area of operation of its own and other units were attached to it. The same is true today with the attack helicopter units on the modern battlefield since, on occasion, the attack helicopter unit will be in charge of the battle in a given sector and it will have other units attached to it, although this will not be the norm. Due to its mobility, we won't want to tie this very scarce resource down to one piece of terrain. Until we have far more attack helicopter units than we do now, assigning the attack helicopter unit a sector of ground will be rare. This could occur, however, in covering force operations, screening, or where the enemy had attacked in such strength that our forces were in such disarray that the higher commander would task the attack helicopter unit commander to assume command.

Right now there are only two attack helicopter battalions in the Army—one in the 6th Cavalry Brigade and the other provisionally formed in the 101st Airborne Division. In Europe, where they have long wanted additional attack helicopters, attack helicopter companies are being formed for each division. The limit is our assets; we just won't have the *TOW*-equipped attack helicopter in numbers for some years to come. I personally believe that each division with





"... This allows the attack helicopters to attack in mass. . ."

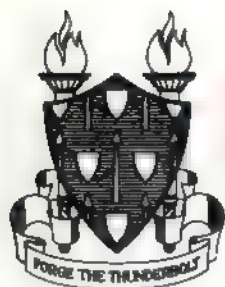
which we intend to fight on the modern battlefield should have an attack helicopter battalion. This would be its reserve. This would be its counterattacking force capable of influencing the action in any part of the division area. As a division commander, I would be willing to trade off one of my current maneuver battalions in order to achieve this capability.

Given that a division has only one attack helicopter company organic or attached, how then does the division commander employ this unit? He is faced with the dilemma that if he employs it too soon and too often he will attrite this force rapidly and won't have it later in the battle. On the other hand, if he holds it back as a division resource and only employs it after one of his brigades is in serious trouble and the enemy's main thrust has been positively identified, it may be too late. He may well force the employment of the attack helicopter unit in unfavorable circumstances. The attack helicopter has its greatest advantage when the enemy is moving and is limited by terrain. One ideal circumstance is where the enemy is attacking down a valley bounded by hills that are an obstacle of consequence. This allows the attack helicopters to attack in mass, achieve surprise, not have a difficult target acquisition problem nor have to worry unduly about other enemy forces to their flank. In the initial stages of an operation, a division commander might elect not to place his attack helicopter company OPCON to a brigade for possible further employment with a battalion task force. However, he should anticipate its employment early so that it can be positioned forward and ready to go on very short notice. Quite often this means that the scouts will be down to battalion or even company level in the area of anticipated enemy penetration and that a platoon of attack helicopters would be positioned forward, sitting on the ground waiting for employment. Only in this way can the commander assure that they will be employed under optimum circumstances, that is, when attack helicopters can fire effectively from maximum standoff ranges. Faced with an attack helicopter

threat, enemy tanks will not stay in the open any longer than they have to. By having the attack helicopter company under the OPCON of a brigade does not mean that the division commander has lost his Sunday punch should a major threat appear in another brigade area. One short radio transmission can direct the attack helicopter company to the threatened area.

A question often asked is why do we need scouts in the attack helicopter unit since attack helicopters can acquire their own targets? Scouts serve a variety of functions. They are the liaison officers who go to supported units and make the advance coordination necessary for the employment of attack helicopters. They are at battalion CP's watching for development of the battle and anticipating employment. They find battle positions for the attack helicopters. They lead and direct them into position. A scout is a battle captain. He is the constant factor on the battlefield directing first one attack helicopter platoon and then another after the first has expended. Riding in the less expensive of the two air vehicles, he is also the more expendable of the two. He is the one that we expose more to the enemy.

In short, a new member has joined the Armor family, one which is short on armor protection and staying power, but long on mobility and firepower. The attack helicopter unit, with its blend of attack helicopters and scouts, provides the commander with a new capability to influence the outcome in any portion of his battlefield on short notice.



FORGING THE THUNDERBOLT

New Subcaliber Device

An *M-60* tank main gun subcaliber firing device that pays for itself in six shots has been successfully developed by soldier-technicians of the American 2d Infantry Division in Korea. Consisting basically of a tank ammunition shell casing with a .50 caliber *HB M-2* machinegun barrel mounted inside, the device uses the breech-block, firing mechanism, and fire control equipment of the tank itself.

Costing less than \$600 each to produce, the subcaliber device fires .50 caliber, armor piercing, incendiary ammunition that produces an easily visible flash-on-impact at ranges to 1,200 meters. The .50 caliber round costs less than \$1, compared to the \$100 plus figure for a single round of full service 105-mm tank ammunition.

The device itself is a simple one with only two major components: the barrel mount assembly, and the solenoid firing mechanism.

The barrel mount assembly consists of a standard "off-the-shelf" .50 caliber *HB M-2* machinegun barrel mounted inside a 105-mm shell casing, the base of which has been specially threaded for that purpose. The muzzle is supported by a steel arch which has a barrel locking and adjusting capability to allow orientation of the device within the base of the 105-mm main gun.

The breech-block of the main gun serves as the breech-block for the subcaliber device. The extraction lips on the base of the shell casing must be milled to permit the breech mechanism to operate without extracting the device.

The solenoid firing mechanism is an electrically operated device essentially made up of a spring-loaded firing pin, triggered by a 2½-ton truck starter solenoid. The electrical impulse that activates the solenoid is received through the primary main gun firing circuit, allowing the crew to use all of the normal fire controls associated with firing the main gun. Only the manual firing mechanism cannot be used as it does not produce sufficient current to activate the solenoid.

In addition to the major components, each device is issued with special equipment designed to facilitate operation and maintenance. This equipment includes:

- An operating tool storage bracket (saddle) designed to be mounted on the main gun counterbalance, and used to store the solenoid firing mechanism during loading and unloading procedures, the manual extractor, and the special purpose wrench/breech closing device.

- The manual extractor which is used to extract the spent .50 caliber cartridges.

- The special purpose wrench/breech closing device used during assembly/disassembly and to trip the extractors and close the breech after loading.

- The wear gauge designed to check for firing pin wear.
 - The storage container fitted to receive, store, and safely transport the device and all associated equipment.
 - The slide hammer used to remove the device from the 105-mm chamber
 - Spare firing pins and firing pin guides.
 - Appropriate technical and training publications.
- The sub-caliber device itself is easily installed.
- Remove the main gun firing mechanism.
 - Open the breech and insert the barrel mount assembly, aligning the vertical witness line with the arrow pointed to the 12 o'clock position. Trip the extractors and allow the breech to close, seating the device.
 - Install the saddle on the main gun counterbalance and place the solenoid firing mechanism, breech closing tool, and the manual .50 caliber extractor in their appropriate positions.
 - Connect the solenoid power lead to the electrical firing circuit, insert it into the breech, and lock it in place.

In addition to its simplicity, ruggedness of construction is another advantage of this unique training aid. Initial tests conducted in the field by the division's armored units have shown that the device withstands rigorous and sustained use and can be fired both from the halt and on the move.

Perhaps most importantly of all, however, the subcaliber device makes otherwise routine gunnery practice interesting and challenging. The speed and accuracy of each tank crew can be easily measured and evaluated, and the competition between units grows daily.

Magee Device

A device which permits using the *M-60A2* tank's *M-85* machinegun for simulated firing of the main gun has recently been developed by Sergeant First Class John R. Magee of the Master Gunners Branch, Weapons Department, U.S. Army Armor School. The device uses the Wallace theory to establish an electro-hydraulic link between the main gun and the *M-85* machinegun so it can be used as a subcaliber device on Tables IV - IX.

There is an electro-hydraulic link built into the stabilization system of the *M-60A2* tank that will cause the *M-85* machinegun to duplicate the gun launcher movement, therefore, no fabricated mechanical link is needed. The only item needed is a single shot device. This single shot device can also be modified with a single-pole, double-throw (SPDT), center-off switch, allowing the tank commander to fire the *M-85* in the normal mode.

The advantages accredited to the Magee device are:

- Low cost ammunition of the type available to tank units.
- No modification of the vehicle.
- Full crew interaction on all engagements.
- No security necessary, since the device is the only item needed.

- It is accurate to 1,600+ meters.
- No parallax error because the *M-19* computer removes the parallax.

- Adds a new combat dimension allowing the gunner to fire the *M-85* machinegun single shot (ranging gun) or as an automatic weapon.

- **COST** - The single shot device costs \$37 00 and the single-pole double-throw (SPDT) switch costs \$2 05. The device, including TASSO labor, is approximately \$58 00.

- **Ease of installation** - it can be installed by the crew.

To install the Magee Device use the following procedures:

Note. Follow normal safety procedures

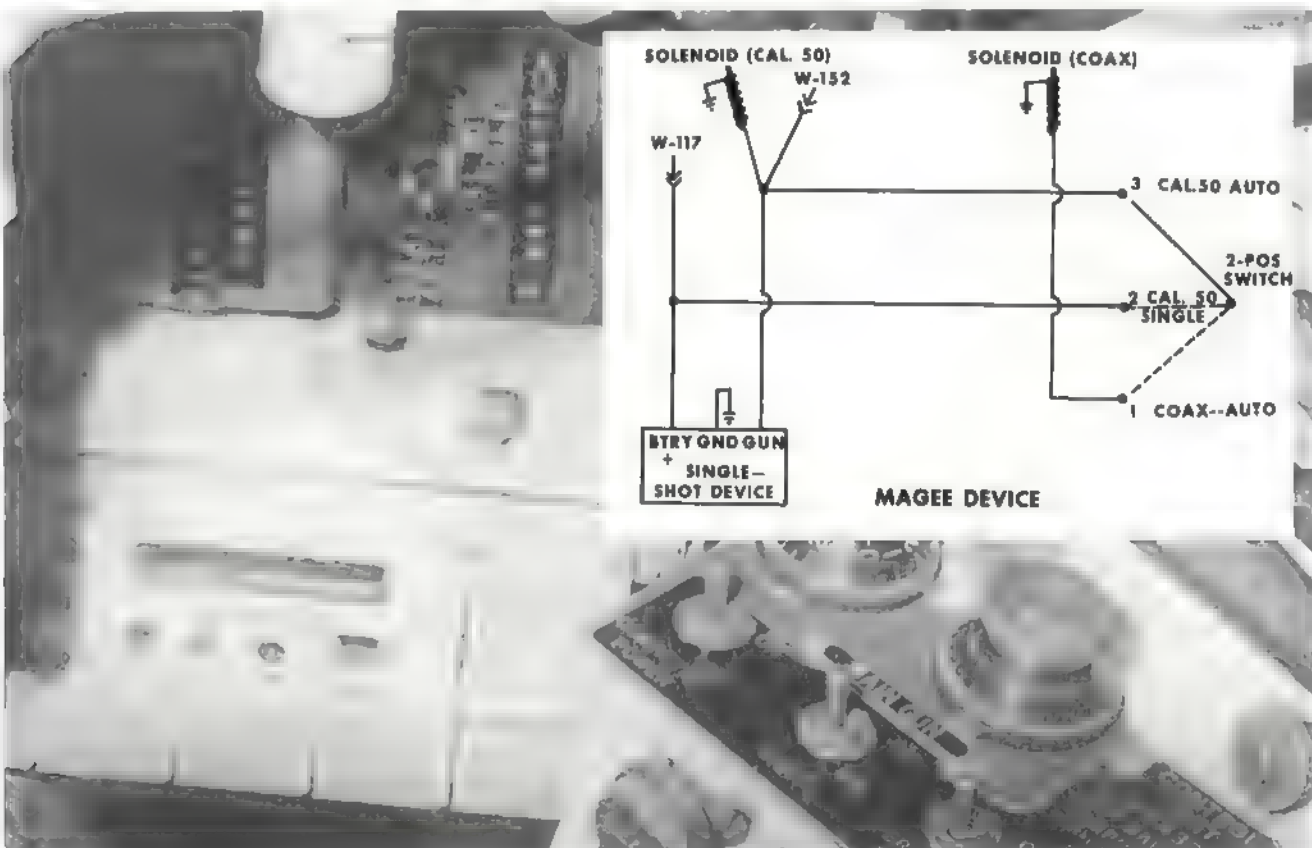
1. Disconnect wire W117-P6 from the COAX machine gun solenoid.
2. Connect wire W117 on the Magee device to wire 117-P6, disconnected from the COAX machinegun solenoid.
3. Connect COAX wire of the Magee device to the coax machinegun solenoid.
4. Disconnect wire 152-P7 from *M-85* machinegun solenoid.
5. Connect wire 152 on the Magee device to wire 152-P7, disconnected from the *M-85* machinegun solenoid.
6. Connect Cal .50 wire on the Magee device to the *M-85* machinegun solenoid.

7. Connect ground wire to a suitable ground connection.
8. Load the *M-85* machinegun with *API-T M-20* or *M-17* tracer ammo, and select low rate of fire.
9. Place turret and cupola in STAB mode and null out all drift.
10. Place the gun select switch on the commander's panel to MAIN.
11. Turn on *M-19* computer, ensure the gunner has control
12. Place automatic Manual range switch to AUTO
13. Place gunner's armament selector to COAX.
14. Please the switch on the Magee device to cal. 50 single.
15. Use the gunner's power controls and firing triggers to zero the *M-85* cal .50 machinegun with the *M-50* periscope at a range of 1,000 meters, using standard techniques.

Caution. The gunner's hatch cover must be closed before firing the *M-85* machinegun to prevent hot brass from falling into the gunner's compartment

16. Engage targets using conventional gun launcher techniques. This device is effective out to tracer burn-out range — 1,600 meters. The trajectory of the *M-17* or *M-20* tracer approximates the trajectory of the *M-409 HEAT-MP* round and does simulated conventional gun launcher firing. This device will only work in the stabilized mode of operation because in this mode the *M-85* machinegun will duplicate gun launcher movement.

The device has no disadvantages, as it does not compromise the operation of the *M-60A2* tank in any way.



COMBINED ARMS:

A LOOK AHEAD

by Captain Joseph R. Inge and Captain James P. Isenhower Jr.

The lessons of the October 1973 Middle East War were many and varied. Important though they all are, the principal benefit realized through careful analysis of the results of this conflict was the validation of the Army's reorientation from the Vietnam era to preparation for combat on the modern battlefield. Particularly highlighted in the battles of

force structure and organization for combat must be considered as well.

The U.S. practice of task organizing combat elements on team and task force levels has proven to be satisfactory in the past. This fact can be attributed for the most part to the type of conflict in which the U.S. has been called upon to operate—one of long-term warfare characterized by sufficient preparation, time, manpower, supply, planning, etc., as well as protracted, yet sporadic, combat. Such will not be the case if the U.S. is called upon to commit her forces in battle under conditions currently envisioned and as already discussed. The importance of properly preparing for combat under these conditions cannot be overstated. Thus, it is incumbent upon our forces to be so oriented that the term "combined arms" is not just a technique to be considered, but is, in fact, a way of life.

The technique currently practiced in U.S. armored and mechanized infantry divisions of task organizing only when the mission so dictates has several critical flaws that must be corrected if the U.S. is to field a truly effective fighting force. These discrepancies relate primarily to the ability to conduct sustained combined-arms operations during the conditions of confusion and mayhem that will certainly exist. This capability, probably best termed "staying power," can only be attained by training and living combined arms. Furthermore, the current organization of the division does not fully exploit some of the more pertinent advances of the Reorganization Objective Army Division (ROAD) concept, where battalions can be easily interchanged within brigades.

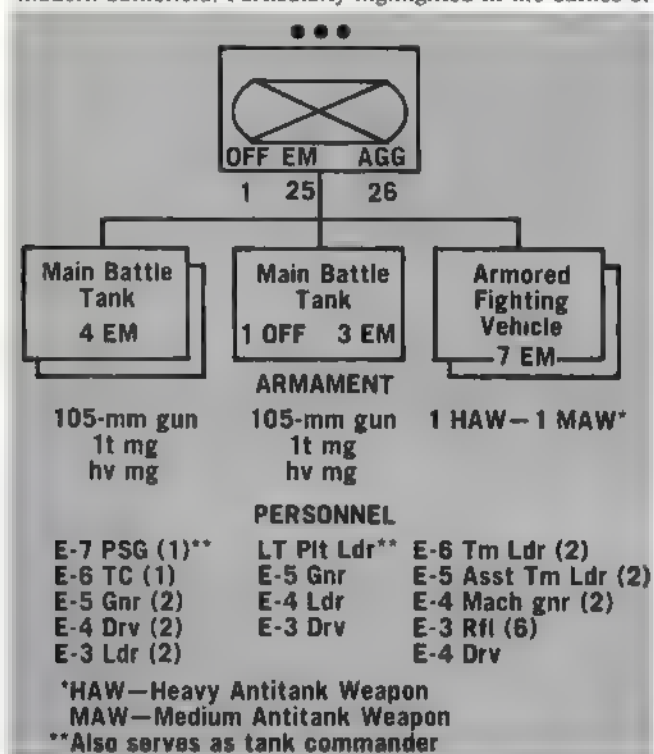


Figure 1. Combined-Arms Platoon

this conflict were the importance of:

- Minimizing the exposure of personnel and equipment.
- Maintaining mutual support at all times.
- Effectively fighting as combined-arms elements.
- Training to fight on the modern battlefield as combined-arms elements.

- Being capable of conducting effective night operations.

As a result of these lessons, a revitalized major effort has been undertaken by the U.S. Army to prepare itself for the type of conflict in which it can expect to be engaged against forces of the threat nations, or those trained and/or equipped by them. The tactical characteristics this effort seeks are responsiveness, flexibility, mobility, and a high armor-defeating capability. However, the focus of this effort to date has primarily been on training and doctrine, with little or no emphasis on organizing troops for combat once they have received the proper training. It is obvious that, training notwithstanding, the numerous lessons concerning

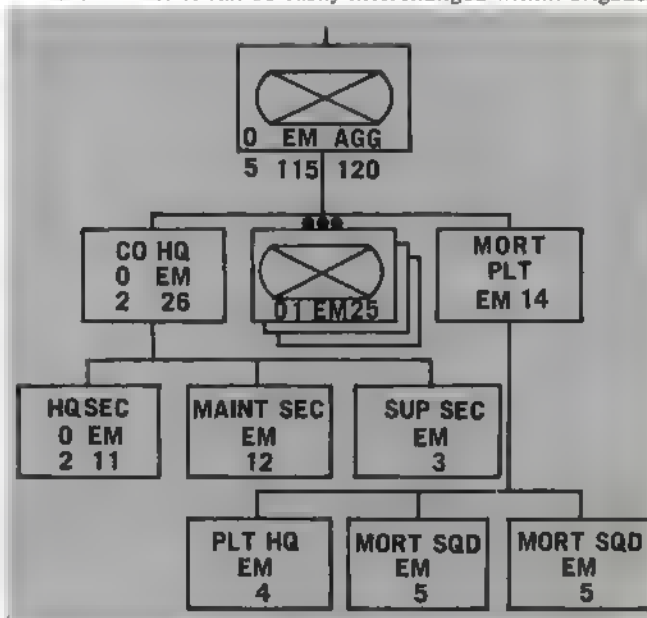
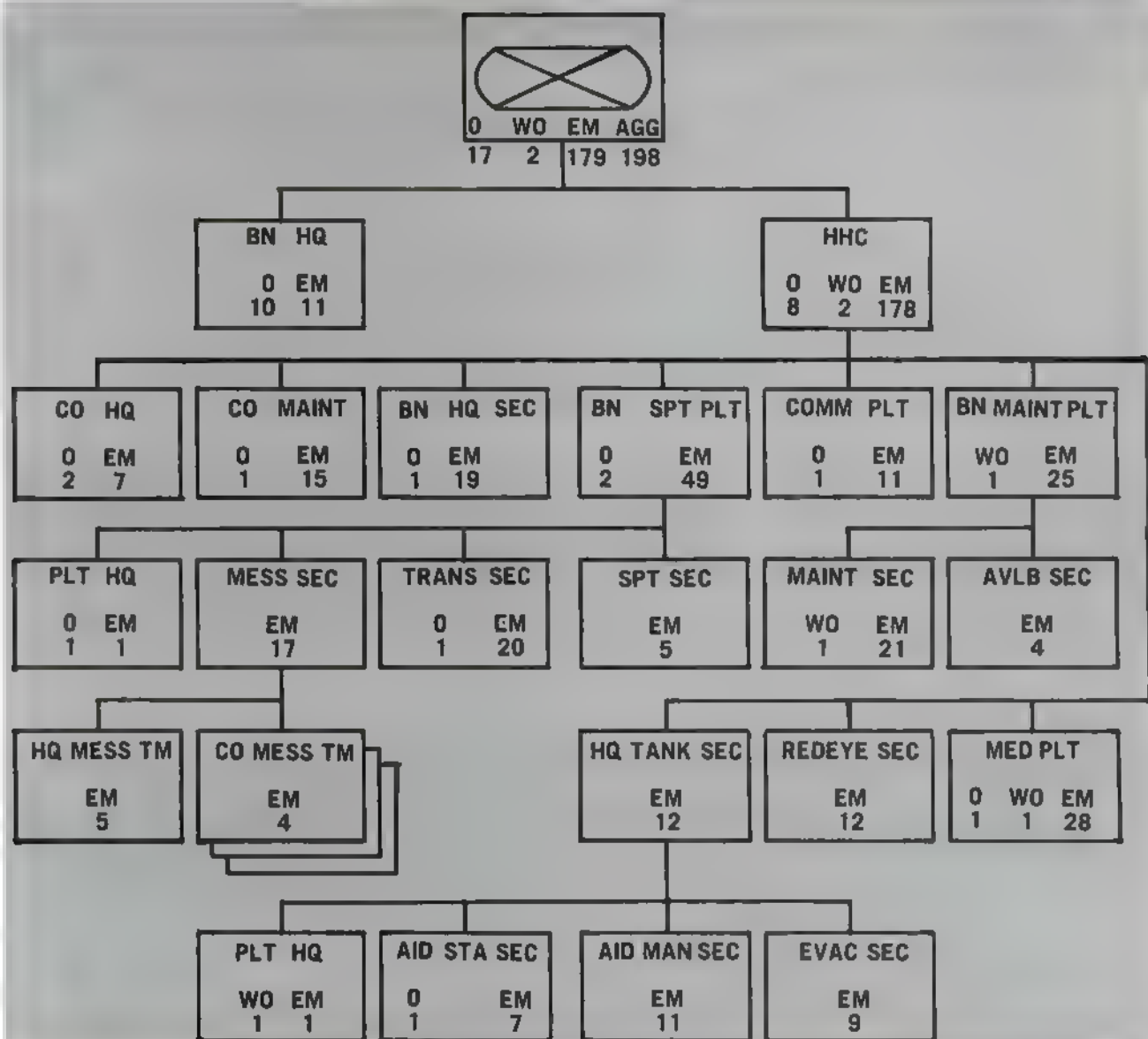


Figure 2. Combined-Arms Company



on the armor-dominated battlefield.

The basic building blocks of an effective combat division are well organized, effective combined-arms platoons (figure 1). The importance of the platoon as an efficient fighting force is well documented, as is the criticalness of combined-arms operation—even at that level of organization. The foot soldier as we have known him can no longer survive alone—and neither can the tank. The proposed combined-arms platoon is an organization consisting of three main battle tanks (MBT), with four-man crews, and two armored fighting vehicles (AFV) capable of transporting seven infantrymen each. The most attractive aspect of this organization is its ability to fight as a self-sufficient armor-killing unit. It should be emphasized at this point that by permanently integrating infantry and armor soldiers at the platoon level, a number of inherent advantages are realized. They include:

- *Flexibility during combat.* Infantrymen can become replacements for tank crewmen and tank crewmen whose equipment is destroyed can fight as infantry. Task organization down

to platoon level provides an integrated team that can provide internal mutual support.

- A minimum number of soldier personnel travel on each vehicle, thus minimizing the effects of catastrophic hits.
- The unit is of manageable size for both combat and training.
- The requirement to cross attach or reinforce is eliminated.

Each of the advantages listed above provide capabilities that will be invaluable in the heat of battle. As the unit expands and builds from the platoon all the way to division level, the importance of these factors becomes even more pronounced.

The proposed combined-arms company is illustrated in figure 2. Here again is a unit that attains the important objectives outlined earlier. It has a high armor-defeating capability, can provide its own security, and can seize and hold terrain if necessary. Assisted by its slimmed-down design, the combined-arms company can accomplish these and other missions by applying maximum combat power at the decisive place and time, while minimizing the effects of undue exposure to its personnel. The company commander is provided with his own, immediately-responsive, indirect fires. His unit is extremely flexible, as it is light enough to perform screening or reconnaissance missions, and heavy enough to fight effectively in major engagements.

By building upon the combined-arms platoons and companies, the battalion itself is a strong, flexible and highly mobile organization whose attributes include those inherent to its subordinate elements, plus those inherent to increased firepower and mass. Significant changes have been made to the combat support (CS) and combat service support (CSS) elements throughout the battalion. The effects of these changes are isolated primarily in the battalion headquarters

and headquarters company (figure 3).

In order to maximize the flexibility of the division, it is proposed that the division be organized in four brigades, each with three battalions (figure 4). Under this concept, the division commander can employ his brigades in echelons; a capability that employs depth to enhance control, flexibility, CS and CSS, and operations on a 24-hour basis. The proposed organization of the brigade provides a most important asset in the form of a scout/messenger unit which will prove to be invaluable in an effective electronic warfare (EW) environment. This unit will operate on trail-type motorcycles, be equipped with long-range secure communications, and possess a highly mobile tank-killing capability. It is important to note that two brigades are pure combined-arms elements. The other two brigades are each composed of a combined-arms battalion, an airmobile or mechanized infantry battalion, and a pure tank battalion, thereby further enhancing the commander's flexibility to meet any conceivable situation.

There are several other significant alterations considered essential for the division base. These include the addition of two field artillery battalions—one 155-mm self-propelled (SP) battalion for direct support of the additional brigade, and one additional 203 SP battalion for general support and general support reinforcing roles. Additionally, there are dedicated brigade contact/recovery teams in the DISCOM structure, a division combat intelligence company, and a combat aviation battalion. Each of these proposals is designed to provide the commander the increased combat staying power previously discussed.

Although each element of combat support and service support at division level has not been addressed, it is considered fully feasible to simply tailor the current organiza-

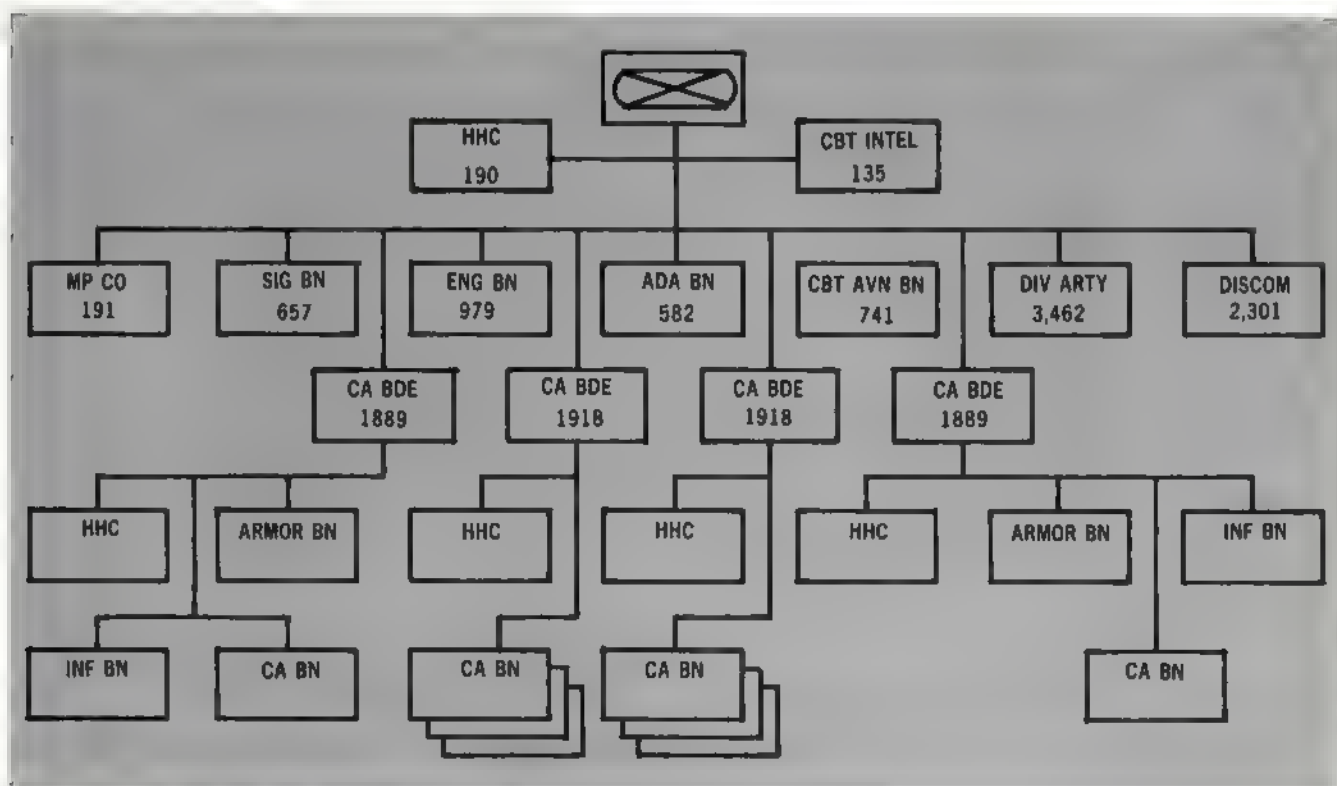


Figure 4. Combined-Arms Division

tions for combat, much in the same manner as has been done with the combat forces. In fact, if there is any validity to the concept of permanently integrated fighting forces, there might also be validity to allocating CS and CSS elements on an integrated basis where they are directly responsible to combat force commanders. For instance, the division's CS and CSS assets could be subdivided into brigade *slices* or *packets* that are controlled by a member of the brigade staff—other than the S-4 (probably a personnel augmentation requirement). There appear to be a number of advantages to such a proposal, but this subject is so vast that it warrants more detailed study than can be given here.

It is recognized that there are disadvantages inherent to the division organization concept as discussed thus far, not the least of which include:

- A small increase in the personnel strength of the division.
- A requirement for a realignment of personnel and equipment as they now exist in the armor/mechanized divisions.
- A requirement for adjustment of attitudes and hardline branch parochialisms.
- Training requirements for key personnel above that which is currently provided.

Nevertheless, it is felt that the advantages heavily outweigh the disadvantages and deem the concept worthy of further consideration. Principal among the advantages are that this organization:

- Provides the commander maximum responsiveness and the flexibility to perform a myriad of missions.
- Mounts all personnel in organic fighting vehicles and possesses a high armor-defeating capability (see Table 1 for a comparison of tracked vehicles).
- Minimizes casualties caused by catastrophic hits to troop-carrying combat vehicles.
- Enhances operations in an EW environment.
- Has a true 24-hour fighting capability.
- Increases organic field artillery support by 50 percent.
- Enhances combined-arms preparedness and understanding
- Maximizes continuity of equipment and training

TRACKED VEHICLES

	COMB ARMS DIVISION	ARMOR DIVISION	MECH INF DIVISION
Main Battle Tank	372	324	218
Arm'd Fighting Veh	192	0	0
Arm'd Pers Carrier	188	513	558
Hvy Mort Carrier	0	44	40
Lt Mort Carrier	74	45	54
Carrier, Comd Post	90	71	66
Med Recovery Veh	66	30	20
Lt Recovery Veh	12	42	44
Carrier, Cargo	24	0	0
AVLB	20	12	8
TOTAL (Less Cav Sqn)	1036	1081	1008
CAVALRY SQUADRON			
Arm'd Recon/Abn			
Aslt Veh	0	54	54
Arm'd Pers Carrier	0	25	25
Carrier, Comd Post	0	6	6
Lt Rec Veh	0	5	5
Hvy Mort Carrier	0	9	9
TOTAL FIGHTING VEH (Maint Consideration)	1036	1180	1105
TOTAL FIGHTING VEH (Combat Power)	564	474	372

NOTES:

1. An armored fighting vehicle is an armor-protected troop carrier mounting a heavy antitank weapon and a heavy caliber (40-mm—automatic cannon).
2. Fighting vehicles include main battle tanks, armored fighting vehicles, and armored personnel carriers mounting a heavy antitank weapon.

Table 1

throughout the division, thereby enhancing deception, maintenance, training, etc.

In conclusion, it goes without saying that a reorganization of this magnitude deserves deeper study and consideration than space and time permit in an article of this type. However, history clearly indicates that technology dictates reorganization from time to time in order to take advantage of progresses in the state of the art of waging war. This proposal may not be the ideal solution, but it is hoped that it will generate further thought and consideration by others, and thus ultimately contribute to aligning the Army on its proper course during the last two decades of the 20th Century.



CPT JOSEPH R. INGE was commissioned in Armor in 1969 through the ROTC program at Virginia Polytechnic Institute. Following a tour in USAREUR as a platoon leader and a company commander in the 3d Armored Division, he served as S-3 in Tank Dn, 3d AD, G-3 training at JFK Center and as a company commander in the 2d Infantry Division. A recent graduate of AOAC, Captain Inge is currently serving as Area Commander, Southeast Region Recruiting Command, Waycross, GA.



CPT JAMES P. ISENHOWER, JR. was commissioned in Infantry upon graduation from the United States Military Academy in 1969. Following a tour in USAREUR as a platoon leader and company commander in the 3d Infantry Division, he served with the 1st Aviation Brigade, Vietnam. Captain Isenhower, former Chief of Plans, Deputy of Training, U.S. Army Aviation Center, is a recent graduate of AOAC and is currently serving as S-3 of the 2d Brigade, 9th Infantry Division, Fort Lewis.

Patton and the Hammelburg Mission

by LTC Frederick E. Oldinsky



"I felt that I could not sleep during the night if I got within 60 miles and made no attempt to get that place."

In the annals of modern history, there are few men who have been more controversial than the great general, George S. Patton, Jr. He was loved by many, hated by some, respected and admired by most. Regardless of personal feelings, there is little room for argument that Patton was one of the greatest military commanders to ever take to the field of battle. He was colorful, charismatic, brilliant, and above all, he was audacious. Audacity was foremost in his character, and he scorned timidity in a military commander.

This article concerns a mission initiated by Patton which illustrates his boldness. That mission, which was another controversy in Patton's stormy career, was a raid into enemy territory to liberate American POW's and has become known as the "Hammelburg Mission."

Background

On 22 March 1945, elements of the Third U.S. Army initiated an assault crossing of the Rhine River near Oppenheim and established a bridgehead on the east bank of the Rhine. Even though elements of the 1st Army had crossed the Rhine at Remagen on 6 March, they had done so by capturing the Ludendorf Bridge intact. Patton's 3d Army had, therefore, made the first assault crossing of the Rhine in modern history.

Once across the Rhine, the 3d Army stormed through the Mainz-Frankfurt-Darmstadt triangle, advanced to the Main River, and on 25 March seized bridgeheads over the Main in the vicinity of Hanau and Aschaffenburg.

Intelligence reports had indicated that a prisoner of war camp was located some 60 kilometers east of Aschaffenburg with a population of some 4,700 allied prisoners, approximately 1,500 of which were American. Patton had been aware of reports to the effect that the Germans had been murdering POW's and; therefore, he believed that an effort

should be made to liberate this camp. As Patton stated at a press conference on 30 March: "...I felt that I could not sleep during the night if I got within 60 miles and made no attempt to get that place." Patton believed that if a force was sent to liberate the prisoners it would also serve as a diversionary action to make the enemy believe he was attacking to the east toward Nuremburg instead of the north.

Patton's idea of a foray into enemy territory was met with very little enthusiasm. Major General Manton Eddy, Commander of XII Corps, to whom Patton had given the mission, and Major General William Hoge, Commander of the 4th Armored Division, both disagreed with Patton's order. Additionally, according to Patton's diary, his immediate superior, General Omar Bradley, was also against the raid. For this mission, Patton had visualized a force the size of a combat command with a strength of approximately 3,000 men, 150 tanks, artillery and other supporting units. However, Patton was persuaded to send only a small task force. It is unclear exactly who or what had the dominant influence on Patton's decision to accept a smaller force for this daring venture, but the diary entry on 31 March 1945 would indicate Bradley was the dominant influence. The entry reads:

"I made it (the attack on Hammelburg) with only two companies on account of the strenuous objections of General Bradley to making any (effort) at all."

Eddy and Hoge objected because they believed the mission would fail and that Patton would be severely criticized for the attempt. Patton felt this was a very weak reason for not trying to save hundreds of Americans from being murdered by the Germans. It is also known that General Eddy, after failing to dissuade Patton from the mission, insisted on a small force instead of a combat command. General Hoge,

on the other hand, was in favor of a large force, as was Lieutenant Colonel Creighton W. Abrams, Commander of Combat Command B, who had to actually provide the force. Both Hoge and Abrams were convinced that a small force would never make it, but Eddy would not yield.

A Task Force Is Organized

Colonel Abrams created a task force consisting primarily of Company C, 37th Tank Battalion and Company A, 10th Armored Infantry Battalion. Additionally, there was one platoon of light tanks from Company D, 37th Tank Battalion, and the assault gun platoon and a part of the reconnaissance platoon of the 10th Armored Infantry Battalion. Vehicle strength of this task force was 10 medium tanks, six light tanks, 27 half-tracks, three 105-mm self-propelled assault guns, six jeeps and one *Weasel* for a total of 53 vehicles. Personnel strength was 293 officers and men. The man chosen to lead this battle-weary group (the men had slept only 1 night in 4 days of fighting) was the combat experienced S-3 (operations officer) of the 10th Armored Infantry Battalion, Captain Abraham J. Baum. This composite unit then became known as Task Force Baum.

Task Force Baum Moves Out

In order to cover Baum's departure, Colonel Abrams decided to attack the small town of Schweinheim just east of Aschaffenburg with CCB. The attack was launched on the evening of 26 March, and after 3 hours of fighting, CCB managed to punch a hole in the German defenses. In the confusion created by the attack, Task Force Baum departed swiftly for Hammelburg. Accompanying Task Force Baum on this raid was Major Alexander Stiller, one of General Patton's aides. Stiller's presence would eventually be used by Patton's critics to accuse him of mounting the raid for personal reasons.

Once on the road, Task Force Baum moved swiftly toward its objective. Their orders were to move to Hammelburg as quickly as possible, liberate the POW's and then return. They were to stop for nothing. For the first 20 miles, Baum encountered little opposition—only sporadic small arms and bazooka fire which did little damage to the task force except for the loss of some of the infantrymen riding on the tanks. Baum kept the losses to a minimum by firing on suspected enemy positions as they entered a town and by his fast movement.

After passing through Lohr, the task force encountered a target that was too tempting to ignore. This target was a train loaded with multi-barreled anti-aircraft guns. Baum stopped just long enough to have his men destroy the guns with thermite grenades, and a single round from a tank gun destroyed the locomotive.

Gemunden Is Defended

Seven miles east of Lohr was the town of Gemunden. This was one of the more critical points of Baum's line of march since it was the location of a bridge across the Saale River.

As Baum entered Gemunden, he spotted about a dozen trains preparing for departure. Without stopping, the tanks began firing at the trains and destroyed about half of them. As the column moved farther into town, Baum's force en-



Assault guns such as this were used during the Hammelburg raid.

countered the first significant resistance. Gemunden was well defended and Baum lost three tanks to bazooka fire. Baum himself was wounded in the hand and knee. The tank company commander was also wounded and had to be placed in a half-track.

Baum's men rushed the bridge in an attempt to seize it intact, but the bridge was blown in their face, killing two of Baum's infantrymen who had made it onto the bridge. Baum called CCB on his radio and requested air support to assist him in crossing the stream, but after receiving approval of his request, Baum decided he could not wait and backed out of Gemunden to find another crossing.

Forced To Change Directions

Baum elected to go north to search for another crossing even though the northern route would place another water obstacle in his line of march — the Sinn River (see map, page 17). It was in their search for a bridge over the Sinn that the task force entered the village of Rieneck, approximately 4 kilometers north of Gemunden. In Rieneck, a German paratrooper home on sick leave and tired of the war advised Baum that Burgsinn, 6 kilometers further north was the best place to cross the Sinn.

In Burgsinn, Baum added three more prisoners to the 200+ he had already captured. These three prisoners were a German general and part of his staff. The general identified himself in German and, since time was a critical factor, Baum did not take time to interrogate him, believing any information the general may reveal would have little or no effect on the immediate mission of the task force.

Near the town of Grafendorf, the task force encountered approximately 700 Russian prisoners working on a road gang. When the Americans appeared, the Russians jumped their German guards and disarmed them. More Russians were freed in Grafendorf proper. Baum turned the 200+ German prisoners over to the Russians who assured him they would conduct guerilla warfare in that area until the Americans arrived in force. The task force then continued toward the town of Hammelburg.

Baum encountered his first German tanks near the village of Ober, a mile and a half from Hammelburg. The Germans and Americans exchanged fire and the Germans withdrew leaving both sides undamaged. Baum was apprehensive because he knew there must be more German tanks in the area and that a tank battle would be forthcoming.

Tank Battle Near Hammelburg

Baum elected to by-pass Hammelburg and, near the village of Pfaffenhausen, his apprehension of a tank fight proved correct as the task force was engaged by a significant number of German tanks. While the medium tanks and two assault guns slugged it out with the German Panzers, Baum sent his light tanks, one assault gun, most of the half-tracks and a platoon of infantry on to the POW camp to start liberating the prisoners.

After 2½ hours of fighting, Baum broke through the German line at the expense of five half-tracks and three jeeps. The Germans lost three tanks and three or four ammunition carriers. Additional fighting took place around the POW camp as the German guards fired on the task force with bazookas, rifles and machineguns.

The Camp Is Reached — Lieutenant Colonel Waters Is Wounded

The POW camp was 2 miles south of Hammelburg and was divided into two compounds, one compound housing Yugoslavian prisoners. The Americans mistook the grey Yugoslav uniforms for Germans and started firing into that part of the POW camp. After the tank guns had set fire to a number of barracks in the camp, a Yugoslav officer asked the German camp commander to send several Americans out to stop the firing. The camp commander, a German general named Von Goeckel, asked the senior American POW, Colonel Paul R. Goode, to undertake the task. Colonel Goode agreed and took three other American officers with him, one of whom was Lieutenant Colonel John K. Waters, Patton's son-in-law. A German interpreter accompanied the Americans and they walked out of the camp through the main gate carrying the American flag and a white sheet tied to a pole.

Before the party reached the task force, Colonel Waters was shot by a German soldier hiding in a barnyard nearby. Waters was taken to a hospital in the village where he was treated by a Serbian doctor. Task Force Baum had liberated the POW camp.

The freed prisoners became almost hysterical with joy at the sight of the Americans, and it took Baum several hours to restore order to the camp. This time lost in trying to organize the prisoners to load up and move out back to the Aschaffenburg area may very well have been the crucial element in Baum's mission which cost him "the old ball game," because the Germans had used this time to good advantage in preparing to destroy Baum's force. The tank battalion in Hammelburg still had some operational guns, and figuring that the Americans would return the same way they came, prepared to ambush Baum on his return to Hammelburg. Additionally, a German reconnaissance plane had spotted the task force about 2 o'clock that afternoon near Weickersgruben and had radioed the position and true

strength to the German 7th Army headquarters in the area. The German 7th Army commander, General Von Obstfelder, had been working since early the morning of the 26th to muster enough forces to destroy the raiders. He didn't know the exact size of the force he was opposing, however, until he received the report from the reconnaissance plane.

Baum had liberated 5,000 prisoners, 1,291 of whom were Americans. He loaded approximately 250 of them on his tanks and half-tracks and advised the others to follow on foot or strike out on their own directly west for Aschaffenburg. Task Force Baum then departed for its return trip to the Aschaffenburg area.

The Return Trip

The Americans had hardly gotten outside the gate of the POW camp when the first tank was knocked out by antitank fire from a bazooka. Most of the liberated prisoners saw all hopes of escape fade and quietly walked back into the POW camp to await liberation at a later date.

Baum then turned his force toward the town of Hessdorf, 5 miles southwest of Hammelburg, instead of trying to fight his way through the ambush. Upon reaching Hessdorf around midnight, Baum ran into two roadblocks and had to change directions again, this time shifting north to Hollrich.

By this time, other German forces, rallied by General Obstfelder, were closing in on Baum. At Hollrich, Baum lost three more tanks, a tank commander, and a large number of infantrymen. Baum then moved his forces up a trail to the top of a hill a mile east of Hollrich and regrouped. The task force had now been reduced to three medium tanks, six light tanks, 12 half-tracks, about 100 men and 60 liberated officers in fighting condition. The force was low on gasoline, so he ordered gas siphoned from eight of the half-tracks and burned them. He gave his men a pep talk, placed the



wounded in a building near by, and marked it with a red cross. Baum then formed the column to move out when the Germans attacked.

Baum could see he was surrounded. An unknown number of assault guns were moving up from the south, six heavy tanks and two infantry companies were approaching from the southwest, six *Tiger* tanks were firing from positions from the northeast and a column of tanks was approaching from the direction of Weickersgruben.

Task Force Baum Destroyed

The German attack was rapid, violent and well coordinated, with artillery shelling Baum's forces while the tanks and infantry attacked. The task force fought until all of the tanks and assault guns were destroyed. Baum's men fought like tigers, but were hopelessly outnumbered and outgunned. Their means to resist having been destroyed, Baum broke the remainder of his men into small groups and told them to try to make it back on their own. Baum, Stiller and an unidentified lieutenant tried to evade the Germans, but were captured about 1930 hours that evening. Baum was wounded for the third time when a German sergeant shot him with a pistol while capturing him.

The Germans did not know that Baum had been the commander of the task force and he was taken back to Hammelburg to the camp he had momentarily liberated where he was passed off as a former POW in the camp. The Germans thought Major Stiller had been the commander. The Hammelburg mission had ended. Task Force Baum had been destroyed and most of the survivors were captured.

Controversy Examined

As mentioned earlier, this raid was to become another controversy in Patton's career. The focal point of this controversy was the presence of Patton's son-in-law, Lieutenant Colonel John K. Waters, in the Hammelburg camp.

Critics of Patton quickly seized upon the incident for another editorial assault on him by claiming that Patton had ordered the raid for the sole purpose of rescuing Colonel Waters. Others, in defense of Patton, claimed that the raid was a sound tactical move and had nothing to do with Water's presence in the camp. The real purpose of the raid probably lies somewhere between these two extremes.

The first point to consider is whether or not Patton even knew his son-in-law was in the Hammelburg Camp.

Waters had been captured in Tunisia in February 1943, and sent to Italy. He was moved to Poland and was reported to be in a POW camp near Szubin in early 1945. The Russians overran that part of Poland, but the Germans had already moved the prisoners before the Russians arrived. The fact that Waters had been at Szubin was revealed by the Russian commander in a message to the American military mission in Moscow and word was sent through various channels until it eventually reached Patton. However, Waters' new location was unknown. Allied intelligence later reported that the camp at Hammelburg was a principal camp for allied officers and that many of those at Szubin had been transferred to Hammelburg.

With only this scant information, it is difficult to see how General Patton could have known positively that Colonel Waters was at Hammelburg. Based on his diary entries, it is apparent that Patton hoped or even believed that Waters was in Hammelburg, but that is a long way from knowing he was there. On 23 March Patton wrote to his wife, Beatrice: "We are headed right for John's place and may get there before he is moved." This letter to Mrs. Patton, rather than being a positive statement as to Waters' location, was probably to reassure Mrs. Patton as to Waters' safety for, as mentioned previously, the information was simply not available

to Patton for him to be that certain that Waters was at Hammelburg.

There are obviously dissenting opinions and one such opinion was stated by General (then Lieutenant Colonel) Creighton W. Abrams whose Combat Command B provided the forces for the Hammelburg mission. In a letter to the Chief of Military History, dated 13 September 1967, Abrams stated that when Major Alexander Stiller, Patton's aide, spoke with him (Abrams) and General Hoge, Stiller said he wanted to go along "only because General Patton's son-in-law, Colonel Waters, was in the prison camp." This statement probably reflects Patton's hope that Waters was in the camp rather than an absolute knowledge that he was there.

Whether Patton knew or only hoped Waters was at Hammelburg could be a mute point if the resulting actions were the same. This leads to the heart of the controversy, namely the reason for the Hammelburg raid. If Patton believed that Waters was there, did Waters' presence in fact motivate the raid or was he incidental to the real purpose?

Pros and Cons

A study of Patton's character reveals one important trait which would have made it unlikely that he would risk the lives of almost 300 of his soldiers for no other reason than to rescue his son-in-law. That trait was his love for his men. It touched him deeply to see his men wounded or killed and, on more than one occasion, he had wept over one of his men. Patton's nephew, Fred Ayer, Jr., once asked his uncle why he swaggered around and ranted and waved his pistols so much. Patton's answer sums up his feelings for his men. Patton said:

"In any war, a commander, no matter what his rank, has to send to sure death, nearly every day, by his own orders, a certain number of men. All are his personal responsibility, to them as his troops and to their families. Any man with a heart would, then, like to sit down and bawl like a baby, but he can't. So he sticks out his jaw, and swaggers and swears."

His concern for his men was further evidenced by the fact that, to a great extent, he measured an officer's fitness to command by the number of casualties his unit sustained. Patton was constantly checking the casualty figures in each command in evaluating his subordinate commanders. His concern for the welfare of his men therefore, would, at the very least, prove it to be out of character for Patton to order the Hammelburg raid for the express purpose of rescuing Colonel Waters.

Assuming for the moment that Waters was not the primary reason for the raid, it may be reasonable to assume that Waters was at least a secondary reason. Patton could have been influenced to some degree by Waters' presence if only subconsciously. What is more probable is that Patton ordered the raid for other reasons, with Waters' rescue as a bonus. If so, what were the other reasons?

According to Patton, as mentioned earlier in this article, the mission was launched to rescue the American POW's in the camp and to create a diversionary action to deceive the Germans as to the true direction of the 3d Army's next attack. These two objectives certainly were feasible and the

soundness of them could be found in both precedent and the rules of warfare. General Douglas MacArthur, through a similar daring move, had liberated 5,000 POW's and civilian internees at the prison camps at Santo Thomas and Bilbid in Manila. This action by MacArthur probably had some influence on Patton's decision to stage the Hammelburg raid, for as Patton stated, "he would make MacArthur look like a piker." Not that he would undertake so dangerous a mission just to outdo MacArthur, but it at least indicated that this type of maneuver was possible, albeit the circumstances and location were different.

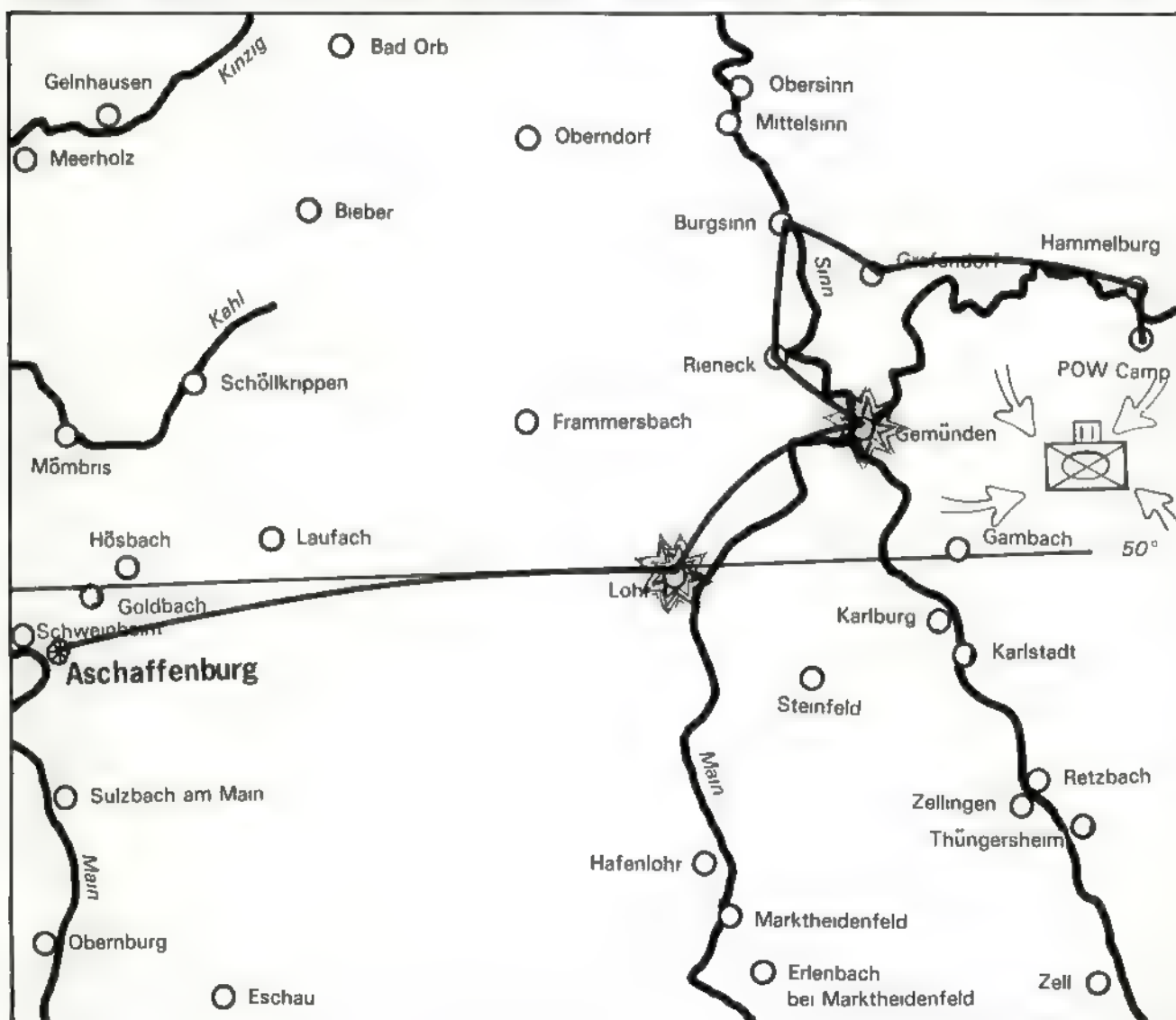
The idea of using the raid as a diversion to deceive the Germans was certainly a sound tactic, both as general policy in warfare and in this particular instance. Third Army was disposed in such a manner to make German intelligence uncertain as to Patton's intention and direction once he launched his offensive from the west bank of the Main River. A foray to the east stood a good chance of making the Germans believe that was the direction of the main effort of the Third Army. In fact, they were deceived.

The only questionable aspect of the Hammelburg mission should be the size of the force sent and not the motives behind the mission. The fact that Generals Eddy and Hoge were against the mission entirely probably had a great deal of

influence on sending a small force rather than the combat command Patton had initially intended to send. There is some disparity in available source material as to the influence General Omar Bradley had on this mission. In addition to the reference of Bradley's opinion made earlier, Patton also stated in a letter to Mrs. Patton on 5 April 1945: "My first thought was to send a combat command, but I was talked out of it by Omar and others..." In contradiction to Patton's statements, General Bradley in his autobiography states:

"I did not learn of the expedition until it had been on the road two days...Certainly had George consulted me on the mission I would have forbidden him to stage it."

One can only speculate as to the true story, however, this writer believes General Patton's version is close to the truth, based on the character of these two men and an entry in Patton's diary on 18 January 1944, long before the Hammelburg incident occurred. The character of Patton and Bradley differed in a number of ways, but most pertinent here is Patton's boldness and Bradley's timidity, and Bradley's political nature versus Patton's total lack of political considerations throughout his life. Bradley would be



much more apt to "sway with the tide" and keep his record clean by denying knowledge of an operation that had failed, whereas Patton was always willing to "stand up and be counted" and accept full responsibility for his mistakes, as he certainly did in the Hammelburg incident. The diary entry of 18 January referred to above illustrates this point. Patton had just been informed that Bradley had been made commander of all ground troops in England when he entered the following in his diary:

"Bradley is a man of great mediocrity. At Gafsa, when it looked as though the Germans might turn our right flank. . . he suggested that we withdraw corp headquarters to Feriana. I refused to move. In Sicily, when the 45th Division approached Ofala, he halted them for fear of a possible German landing east of Termini. I had to order him to move and told him I would be responsible for his rear and that his timidity had cost us one day. He tried to stop the landing operation #2 east of Cap d'Orlando because he thought it was dangerous. I told him I would take the blame if it failed and that he could have the credit if it was a success. . ."

The fact that Patton was willing to take the blame for failure and give Bradley credit for success could very well have been repeated prior to the Hammelburg raid. However, as previously stated, this is only speculation and the absolute truth could probably not be proven one way or the other.

Be that as it may, there is little doubt that the partial failure of Task Force Baum was caused by insufficient strength. Note the term "partial failure," for in some ways the mission was a resounding success, proving at least in part that the raid was a sound tactical maneuver.

Raid Not A Complete Failure

Most of the critics of the Hammelburg raid give the impression that the entire task force was annihilated and accomplished nothing in the process. Statements have been made that 300 men were sacrificed to satisfy Patton's whim. The record does not bear this out. Interviews with captured German officers and official German records bear testimony to the fact that Task Force Baum accomplished the mission of creating a diversionary action. General Von Obstfelder believed that Task Force Baum would be followed by the 4th Armored Division and possibly the entire 3d Army because he still did not know they were swinging north. Other German units, elements of an estimated three divisions, were diverted to the Hammelburg area to stop Task Force Baum and to block the suspected follow-on attack. Some of those units would have been used against the Third Army in the north had they not been diverted. The effect of the diversion of those units on the subsequent advance of the 3d Army was evidenced by the fact that the 4th Armored Division didn't fire a shot for the first 90-100 miles in the attack.

In addition to creating a diversion, the Task Force inflicted considerable damage on the Germans while enroute to Hammelburg. Baum's forces had destroyed 12 German trucks, three tanks, three or four ammunition carriers, at least six locomotives and 12 trains, a number of anti-aircraft guns, disrupted troop movement schedules, notified the Air Force of a lucrative target (the marshalling area) at Ge-

munden, and captured over 200 prisoners. In addition, it can be assumed that the 700 Russian prisoners released around Grafendorf must have caused considerable problems for the Germans if for no other reason than requiring additional forces to be diverted to recapture them. The same was true of the liberated American POW's who chose to strike out on their own in an attempt to make it back to the American lines.

There was also the psychological effect on both the Germans and Americans. The Germans suffered a blow to their morale, both military and civilian, in the realization that their defenses were insufficient to prevent an American raid deep into their territory. The entire area was thrown into confusion and caused a great deal of panic. The American POW's were given a morale boost by the knowledge that they were not forgotten and a brighter outlook toward permanent liberation, since they learned from the task force how close the main American forces were.

The American casualty picture from the raid was not as dismal as that painted by the critics. Of the 293 officers and men comprising the task force, only nine were killed, 32 wounded and 16 missing. The remainder were captured and returned at a later date.

As for Colonel Waters, both he and Captain Baum were liberated, along with the other wounded American prisoners, by a task force from Combat Command B of the 14th Armored Division commanded by Lieutenant Colonel James Lann of the 47th Tank Battalion. The rest of the prisoners had been moved from the Hammelburg camp shortly after the raid by Task Force Baum.

Conclusions

This writer disagrees completely with John Toland, who states in his book *The Last 100 Days* that "The mission to Hammelburg was a complete failure. . ." The mission failed only from the standpoint of returning with the prisoners. All in all, a great deal had been accomplished by a very small force of heroic, dedicated men who, like their Army commander, used audacity to accomplish an extremely difficult task.

Anyone wishing to review the author's bibliography and footnotes may do so by writing to ARMOR. Ed.



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Physical Readiness for Everyone

by Captain Thomas L. White

That physical readiness is a critically important quality in soldiers is not a subject for debate. It is fact. The rationale to support that premise can be extracted from a wealth of historical material and is liberally documented in a number of official U.S. Army publications. Having accepted the basic merit of the subject, the remaining question is essentially twofold. First, what type of program is necessary to establish physical readiness and second, how should that quality be tested?

The contention advanced here is that the former area of interest, physical fitness programs, is well in hand while the latter issue is sadly lacking. Great strides have been made in recent years to develop physical fitness activities that are both innovative and challenging. The well publicized combat football program is a prime example of the positive effect that physical fitness can have on a unit. In contrast to this, the testing side of the coin is still in the dark ages. It is the purpose of this article to examine the current testing program in regard to the following issues:

- Who should be tested?
- What tests?
- How should the tests be administered?

Within each area the deficiencies of the current program and a recommended solution are offered.

Who should be tested?

The answer to the above question is simple — everybody. Perhaps a bit of elaboration is necessary to settle the issue. The current program excludes personnel over 40 years of age from any mandatory physical testing requirements. No evidence can be found to support 40 as the golden age of inactivity. On the contrary, consider the following policy statement:

"There is no reason why persons over 40 should not maintain a degree of fitness commensurate with their age." (FM 21-20)

If our older soldiers (as opposed to "old soldiers") are expected to be physically fit as the policy statement seems to indicate, they should be made to *prove* it along with everyone else.

The other side of the age question has to do with the link between physical fitness and battlefield performance. Success in combat is predicated on physical readiness. It is highly doubtful that our future enemies will be so considerate as to not shoot anyone over 40. The cornerstone of successful command is leadership by example, which in this context means that all leaders, regardless of age, must be able to endure the same physical rigors that confront their younger troopers. The readiness of each soldier, young and old, to meet this challenge must be tested.

As a final point in the age issue, it is recognized that there are many older soldiers who presently take physical fitness tests on a voluntary basis. They are invariably our best leaders. This does not obviate the need to formalize the re-

quirement. To paraphrase General Bruce Clarke, "It's not the outstanding leader that training programs must account for, but the problem of making the substandard ones adequate." Without a formalized, enforced requirement a great many of the senior troopers of the Army will continue to dodge the fitness issue. The recommendation here is that every soldier in the U.S. Army, regardless of age or rank, be required to demonstrate his physical fitness on a periodic basis.

What tests?

The current physical fitness testing program is predicated on the notion that physical readiness requirements are related to job description. This philosophy dictates, for example, that fitness standards for infantrymen be significantly higher than those required of clerks. This policy has given rise to a testing program that includes different examinations for a number of generic job descriptions. A grand total of seven different tests are found in the current test program, outlined in the following table:

CURRENT PHYSICAL FITNESS (PF) TEST PROGRAM

BASIC PROGRAM TEST

Basic PF Test (BPFT)

Advanced PF Test (APFT)

Staff and Specialist
PF Test (SSPFT)

Minimum PF Test (MPFT)

SPECIAL TESTS

Inclement Weather/Limited
Facility PF Test

Airborne Trainee PF
Qualification Test

Ranger/Special Forces PF
Qualification Test

PARTICIPANTS

Basic Combat and Medical Basic Trainees
Combat Support, Advanced Individual Train-
ing, Combat Support Trainees

Combat Service Support Units,
Tables of Distribution and Allowances Units,
Students

Over 40 (Voluntary)

PARTICIPANTS

As Necessary

Airborne Trainees

Ranger/Special Forces Trainees

The last three tests reflect the justifiable need to test under unusual conditions caused by either weather, facilities, or particularly demanding duties. The problem in this area lies in the rationale supporting the tests described in the Basic Program.

This array of tests has given rise to a whole host of what I call "second class" soldiers. The troopers on the first team take the APFT, a rigorous, demanding test of strength and stamina. The second string takes the other tests which range in difficulty from the BPFT, which is only a cut below the APFT, to the SSPFT and MPFT, both categorized as a joke. As an example, one can easily amass the minimum required total point score in the first four events of the SSPFT, then *walk* the mile, as no minimum standards are established in any single exercise. Clearly this needs to be fixed.

The rationale which supports the Basic PF Program, that some soldiers need be more fit than others, is specious for several reasons. It's quite easy to cite historical examples of support troops who were required to accomplish combat missions. In fact, our Vietnam experience proved this point on numerous occasions. So there appears to be no grounds to lower physical fitness standards on the basis of primary duty assignment. In addition, experience again shows that second class standards in any area of interest invariably pro-



duces second class units. Physical fitness has a direct bearing on unit pride and morale. It's difficult to generate a great deal of pride when the unit walks the mile while the commander and the sergeant major hold the stop watches (they're probably over 40!).

The fix to the test selection dilemma is quite simple. All soldiers, young or old, should take the APFT on a periodic basis. The revised testing program would include the APFT and the current Special Test Program, which would continue to be administered on an "as required" basis. The current APFT scoring system could easily be extended to include troopers over 40. (See table below.)

APFT SCORING SYSTEM

EVENT	POINTS	17-25	26-30	31-35	36-40	41-45	46-50	Over 50
INVERTED CRAWL (scored in seconds over 40 meters)	100	14	15	16	17	19	25	30
	60	25	27	28	29	31	37	42
RUN, DODGE, JUMP (scored in seconds)	100	19.5	20	20.5	21	24	28	32
	60	24.5	28	25.5	26	29	33	37
HORIZONTAL LADDER (no. of rungs in one minute)	100	83	80	75	69	55	45	35
	60	36	32	27	21	17	13	10
BENT LEG SIT UPS (No. in one minute)	100	54	53	52	51	48	40	35
	60	32	31	30	29	23	18	13
TWO MILE RUN (time elapsed in minutes and sec- onds)	100	14:00	14:10	14:24	14:34	14:44	15:01	15:31
	60	14:09	14:23	14:33	14:43	15:00	15:30	16:00
		18:58	19:08	19:18	19:28	19:38	19:55	20:26
		19:07	19:17	19:27	19:37	19:54	20:25	20:56

Only maximum and minimum scoring levels have been provided. These are the same as current APFT standards through age 39. I have merely extended the table to include all ages. Minimum requirements are 60 points in each event. Failure to meet any event minimum constitutes failure of the entire test.



The end product of this proposal would be a testing program, uniformly administered with the same standards to all soldiers from the Chief of Staff to basic trainees. The proposed testing program would be truly challenging and a source of unit pride — to all units

Test Administration

Test administration includes three subareas; actual conduct of the test, reporting of test results, and recognition of both unit and individual performance. Current physical readiness test administration, while varying widely from unit to unit, reports test scores on an individual basis only. There is no formal unit recognition of physical readiness on an Army-wide basis, nor will you ever find physical readiness reported through any of our formal evaluation processes (Annual General Inspection, Enlisted Evaluation Report, or Officer Evaluation Report). In short, the current administration system is nonexistent in any real sense and consequently, so is physical readiness.

Unit readiness, and all that catch-all phrase entails, is checked formally during the Annual General Inspection (AGI). The results of the AGI are normally given "do or die" priority by commanders and they train and prepare accordingly. Needless to say, if an area of interest is not on the AGI schedule, it will not assume great priority in the eyes of the unit commander. It stands to reason then, that if physical readiness is as important to the Army as we all claim it is, it should be made a formal matter of IG interest.

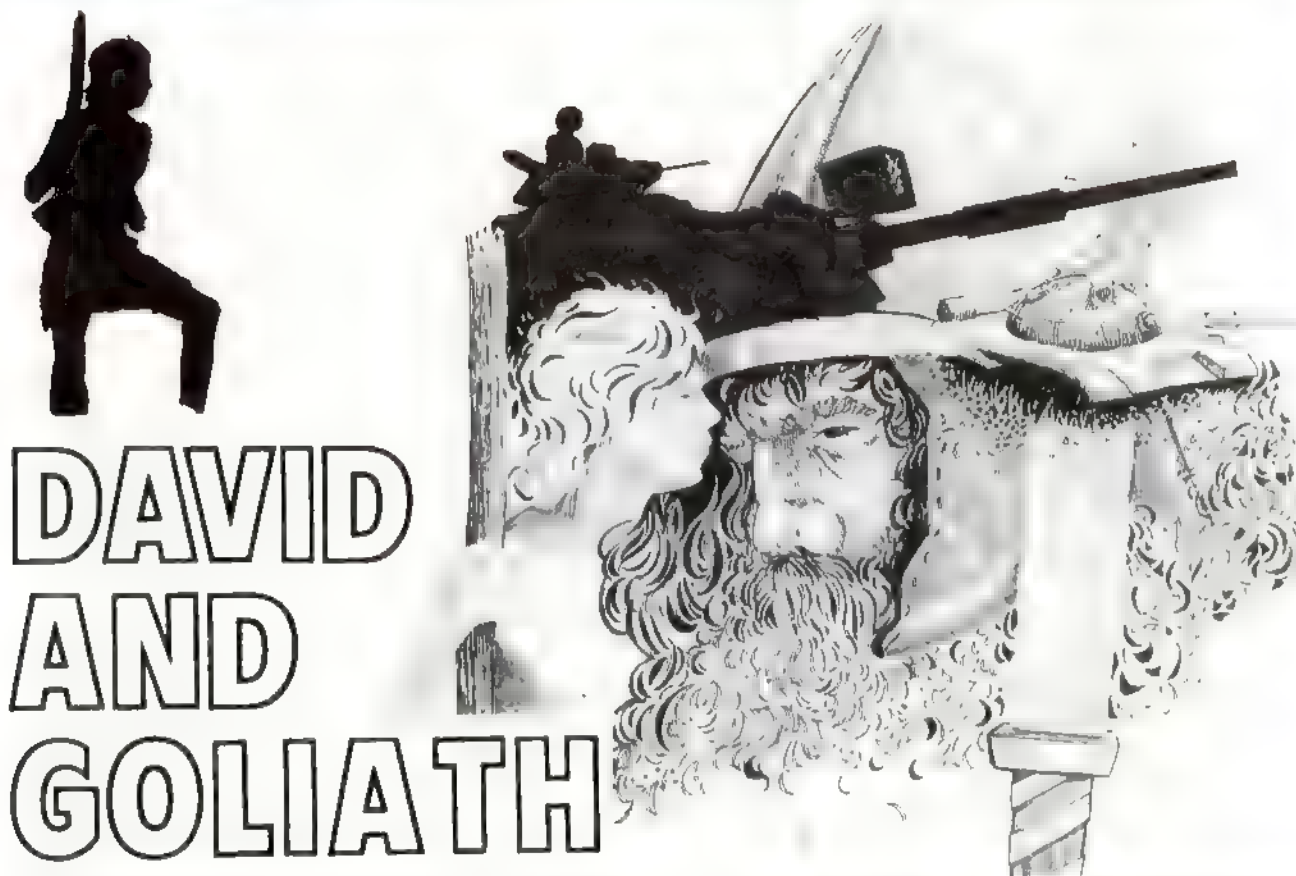
I propose that units would continue to internally administer the AFPT on a semi-annual basis. The results of these tests would be maintained on an individual basis and reported on a *unit* basis in much the same manner that materiel readiness is currently reported. During the AGI, a group of randomly selected personnel from the inspected unit would take the APFT and be scored by IG personnel. If, say, less than 70 percent met minimum standards the unit would be rated unsatisfactory in physical readiness. Also, if the tested individuals' scores varied greatly from those achieved during internal unit testing, the unit could be cited for fudging its records. The point is until physical readiness is given equal billing with other unit performance areas, it will never receive the priority it deserves.

On an individual basis, rewards should be established for extraordinary physical readiness in either direction. Current physical fitness test scores should be typed on the individual's EER/OER when he is rated (standard practice in the Marine Corps). Soldiers found unsatisfactory in physical readiness should undergo remedial training and repeated retesting until they measure up or out. On the positive side, I propose a Physical Readiness Qualification Badge which would be awarded on much the same basis as the current Marksmanship Badge. Soldiers scoring in the top 10 percent would receive a gold badge while all other troopers meeting minimum standards would receive a silver version of the same award. The badges would be good until the next periodic test and would become a distinctive symbol of excellence in physical readiness.

To summarize the proposals in my revised physical fitness testing program I would test all soldiers, using the same examination, on a periodic basis. I would recognize all individuals' performance by formally reporting the results through the EER/OER system and awarding badges for demonstrated excellence. Finally, I would report physical readiness on a unit basis and check the validity of that rating during the AGI. The implementation of this test system would force all units, weak or strong, to vigorously participate in the excellent physical fitness programs that currently exist. The payoff to the Army would be a considerable boost in physical readiness. The payoff to the trooper would be measured by his improved health and general welfare. After all, physical fitness is, in essence, the most absolute form of life insurance.



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DAVID AND GOLIATH

The "How to Fight" team at Fort Knox, in conjunction with similar groups at TRADOC, Fort Leavenworth, and all the other service schools, has been struggling for almost 18 months to communicate ideas to the Army. We have used training circulars, draft field manuals, TV tapes, personal visits, the telephone, the Armor Association, and the pages of *ARMOR*. These ideas have been wargamed, studied, field tested, and are now being taught. After reading the letter of Staff Sergeant Bunce (First Battle of the Next War), and the thoughts of Lieutenant Jordan (Spirit of the Bayonet), both in the March-April 1976 issue, it is obvious that some good men still need some good answers, lest they continue to believe that the Armor School is preparing men to fight on a battlefield different from the one on which they plan to fight.

The following is the introduction to an update briefing on defense being prepared for presentation to Fort Knox visitors, and may contain the answers they seek.

In the first battles of the next war, U.S. forces will be outnumbered. The U.S. Army intends to win the next war. From these two statements stems the entire body of revised tactical doctrine now being enunciated in training literature.

Through a continuing inability to overcome old tactical concepts, old ideas, and the resistance of a substantial number of soldiers who say, in effect, "but we've never done it that way before," and through the continuing inability to perfectly describe the application of principles laid down by General DePuy, Lieutenant General Starry and others, the

Army at large is confused, resentful and unsure of what the "new doctrine" is.

To begin with, the Threat is a large, modern, well equipped armed force, trained to fight in the way large armies fight. It focuses on *Offense* and *Mass*, and intends to overpower and smash any force in its path. To do this, they attack with masses of tanks and mounted infantry, supported by hundreds of artillery pieces including rockets and mortars, hundreds of first line tactical aircraft, and a logistical tail whose size, until recently, was not appreciated by Western armies. This force attacks in a succession of strong echelons, moving swiftly along lines of least resistance, depending upon speed for flank security, and if faced with a determined line of strongpoints, masses forces on a very narrow front to overpower and break through to the rear. This massing can be as much as two divisions on a front of 10 to 14 kilometers. Behind these two divisions will be another two divisions, ready to exploit the breakthrough, day and night, deep into the rear areas.

The problem, then, is to defeat the masses of tanks, BMP's, artillery, and aircraft in that first echelon and in every succeeding echelon, for as long as it takes to convince the Threat force commander that his attack is unprofitable. Now, much has been said and written in criticism of the idea of "winning the first battle" and of preserving the force. What some critics have ignored is the context in which this idea has been presented. "Win the first battle" means that we believe we will *not* have the traditional opportunity to

lose battles for 6 months or a year while we and our allies tool up our training centers and industries to field large armies which *ultimately* overwhelm the Threat armies, winning the last battles and the war. The idea of "win the first battle," and the second, and third, and so on, is simply the obvious conclusion that we must defeat the enemy early, probably often, and not look over our shoulders for new men and equipment. There will not be any. Preservation of the force is another obvious conclusion from the most cursory examination of force ratios. If outnumbered on the order of 5 to 1, we cannot afford to spend one to destroy one, or two or four, or in the end we will lose. Every U.S. tank, *TOW*, artillery tube and aircraft must destroy one of the enemy and then another and another until the exchange ratio exceeds the force ratio. So the idea is not preservation for preservation's sake, but rather preservation for as long as possible *while taking out the enemy in large numbers*. Few thinkers close to the problem hold any notions that troops initially at the point of the spear will survive the war. The message is that while dying for one's country is still an honorable pastime, dying for one's country without first having killed six, eight or ten of the enemy will be a futile gesture.

With this background of the problem, and the driving requirements to win early and often, it follows that the U.S. Army must overcome its "big army" past and learn to operate in ways that permit a small force to defeat a large one. History is full of examples of this kind of result, starting with David and Goliath and culminating in the most recent (October 1973) struggles in the Middle East. That mass is not necessarily the ultimate principle is an idea held by great captains and military writers for years. Marshall Saxe said: "It is not big armies that win battles; it is good ones." B.H. Liddell Hart wrote: "The cult of numbers is the supreme fallacy of modern warfare." And the idea of overall numerical inferiority is implicit in the words of Admiral Mahan: "The fundamental object in all military combinations is to gain local superiority by concentration."

Local superiority, or at least locally satisfactory force ratios, by concentration of forces and fires at the critical point on the battlefield, is the object of the U.S. Army's ACTIVE defense.

David L. Tamminen
Lieutenant Colonel, Armor
"How to Fight" Team

Airspace Management

One of the first things some commanders worry about when the use of helicopter units is suggested is Airspace Management! Forget it—it's a holdover from bygone days in Army Aviation. It's been overtaken by the modern battlefield and the obsolescence of fixed-wing aircraft in the Army's tactical inventory. The fact is, I don't know what we're going to do with all the ATC folks when the bullets begin to fly. We do, indeed, need them for peacetime interface with civilian aviation; but couldn't this be one of those functions the Army could legitimately "civilianize" since there is a minimal wartime Army requirement? Take note that I said Army requirement! Certainly, our sister services continue to generate a requirement for control of their air traffic, but we must face the fact that in the tactical area of operations, we're not going to penetrate their airspace anymore. If we do, we won't survive. Terrain flight will govern Army tactical aircraft. If the situation arises that an Army aircraft, say a *U-21* or *UH-1*, must mix with the boys in blue, we can simply give them a call. Control of the airways rightfully belongs to the Air Force.

Now before anyone cries "bunk," let's look at this subject in a little more detail. First, we'll take the tactical battle area from the brigade's rear boundry forward. We simply don't need an additional agency to coordinate the use of Army aircraft in this area. Consider the point that the majority of these aircraft will be organic to air cavalry and attack helicopter units, and will be integrated into the tactical scheme of maneuver as a maneuver unit. There is a fire sup-

port element at brigade and battalion levels which coordinates the artillery, a Tactical Air Control Party (TACP) from the Air Force which coordinates Air Force sorties, and a unit operations section which coordinates the employment of maneuver units and these supporting fires. These folks, who all work under the guidance and direction of one man, the unit commander, coordinate everything that goes on in the unit battle area. Each unit subordinate to this commander, including aviation units, is involved in a coordinated scheme of maneuver. Aviation units can, and should, be treated as other maneuver units; no special procedures are required. I hear someone saying, "How do you get artillery and airstrikes on the targets?" Simple, you just fire away. That's not meant to be facetious, but there are many who will take it as a joke. In fact, it's as simple as it sounds. Air cavalry, attack helicopters, and other aviation units will deal with the coordination of artillery and airstrikes much as any other combat maneuver unit. The responsibilities for not running into an artillery round are much the same as for an armor unit, except the aviation unit gives some thought to the trajectory of the round—not much—considering the altitudes of Army aircraft that are dictated by the weaponry of the modern battlefield.

What's that? How do we avoid the bombs and "fastmovers"? Once again the aviation unit will deal with the airstrike just as a ground unit does—stay the hell out of the way! The fear of a midair collision between Army and Air Force aircraft has been reduced to a large degree by the

battlefield environment which dictates terrain flight for Army aircraft. The possibility of a midair collision is still there. However, it can be all but eliminated by the rather simple solution of establishing a minimum altitude for Air Force aircraft and a maximum for Army aircraft, with a buffer in between. For airstrikes, the Air Force aircraft will, indeed, penetrate the Army airspace, but this will be coordinated ahead of time—in fact, it only takes a few seconds to get clear once notice is given. If an Army aircraft must penetrate the Air Force airspace, it'll require a call to get clearance either through the TACP or other appropriate Air Force agency. In effect, what will exist is layered airspace. But keep in mind, the ground commander owns it all and coordinates its use. This layering is an added measure for the aviator's peace of mind and safety. I see the airspace management problem, if indeed it is a problem, being solved in a similar manner from the brigade rear boundary further back. The potential for interface of Army and Air Force aircraft will certainly grow the further to the rear one progresses. Perhaps a requirement will continue to exist for some sophisticated type of air traffic control at corps level, or even division level. However, if the corps headquarters is indeed a tactical headquarters, as envisioned by at least one corps commander I know, it'll be a minimum requirement.

Have you ever seen one of those maps with a grid system superimposed over the existing arrangement? Each aviator is issued one of these as a tool of airspace management. Each grid is marked with a coded designation for reporting purposes. Aircraft or groups of aircraft must report their whereabouts to an agency set up to monitor this information. My question is *why*? How do we keep up with tanks? The reporting requirements vary from every 15 minutes to each hour. This system for aircraft, in my judgment, is a waste of time and energy. Someone already owns these aircraft for tactical purposes, whether it's for combat, combat support, or combat service support. An SOP for one unit on REFORGER 75 stated that these position reports were paramount and even took precedence over tactical play.

Realistic training you say! There were also plans, or at least discussions, during REFORGER for setting up instrumented airfields at *brigade level*. It appears that the folks who propose that Army aircraft fly instruments in the brigade area of operations think these aircraft will be invisible to the enemy radar directed weapons. It must be clearly understood by each of us that if we cannot move about the battlefield near the FEBA using terrain flight, then we're going to ride a ground vehicle or walk. Before the retort about being out of range is raised, consider the benefit the enemy will gain by seeing blips on his radar consistently disappearing at or near a particular set of coordinates. Instrumented flight requires altitudes which are unacceptable, in my judgment, as far back as division. I can also make pretty good case for corps.

No doubt this article will be controversial and that's good! If I can generate some serious study of this subject, it's been worth the time and potential barbs. The requirement for some means to control Army aircraft certainly exists. I, for one, think it's a unit problem and does not require sophisticated solutions.

My message is this: Army aircraft, for the most part, are tactical vehicles which will operate in the same environment as ground vehicles as part of a unit. Their mobility and speed do provide a marked advantage over ground vehicles. Beyond that point, Army aviation units do not and should not require special control measures. In order to be fully effective, these units must adapt in every way possible to facilitate integration into the overall scheme of maneuver. We who are in the business of Army aviation simply must recognize the fact that we've entered into a truly tactical environment and some of the sophistication we've inherited and have used in the past no longer has tactical application.

JOSEPH C. GROSS, III

Major, Armor

Attack Helicopter Branch, USAARMS

D Troop May Be Missing

At the risk of beating a redlined helicopter to death, I am compelled to enter into the D Troop controversy that has been raging since General Bartley raised the specter of the myth that D Troop belongs to the Cavalry Squadron. The plain truth is that there are very few advocates of the air cavalry troop where it counts—out in the corps and divisions.

The approved doctrine and the pertinent field manuals are all there, but the fact remains that I have just spent 2 years as a squadron commander fighting a defensive action to hold onto my D Troop. Lest anyone think that my case is isolated, I would point out that two of the divisions in USAREUR do not even have the D Troop colocated with their parent squadrons. You can make excuses about stationing, but you have to admit that separation does not foster the integration and mutual familiarity that is required for successful air/ground cavalry operations. If there is no myth, you would think that the stationing problem would have become serious enough to solve!

Let's look at the aviation assets first. I was able to fight clear of mission tasking for my aircraft because I had a sympathetic chain of command composed of more cavalrymen than is common, but I still paid a price. Two of my light observation helicopters (LOH) were on "hand receipt" to various elements of the division, and three of my utility helicopters (UH) had been absorbed by still other division base elements. Right away you can see that there is some problem in convincing even the most sympathetic audience of the sharp difference between the *aviation assets* of the

division and the *aerial combat craft* of the Air Cavalry Troop that my good and old friend Lieutenant Colonel Gillette refers to. And in reality, it is a hard case to argue in peacetime: the division had missions that required aviation support and the commander had only so many assets at his disposal. Under those circumstances, my troop was either going to fly the support or give up the assets, and I for one would not try to convince my division commander that my assets were not his. So, practicality intrudes on doctrine and "druthers," presenting a real problem that needs to be continually watched and negotiated. The solution rests with all parties being more aware of the problem and the price rather than the niceties of the assets' intended mission.

Next, let's look at some typical missions. I went through three different sets of war plans during my stint with the squadron. One set had the troop OPCON to another

"...most considered the troop to be the squadron's aviation asset at best but not an integral part of its cavalry organization."

organization initially, reverting to squadron control for a covering force role, and then going to division control on passage of lines. Another set of plans had the troop going to division control, period. The one command post exercise (CPX) of that approach showed vividly that the information acquisition capability of the troop far surpassed the collecting capability of the division tactical operations center (TOC), with its multiple responsibilities. The nets simply become jammed with the result that either the reporting must be shunted off, or the direction of the division suffers. The remaining set of plans kept the troop with the squadron, throughout, and represented a true integration of the air and ground cavalry assets. During the period that this set of plans was operative, however, there was a constant tug to find other missions for D Troop that would have detached it from the squadron. In all of this, the least effective argument was that the squadron needed the troop to properly perform its mission. Too many veterans of Vietnam remembered the almost universal detachment of the D Troop from its divisional squadron and believed that we could get along without it. It was apparent that most considered the troop to be the squadron's aviation asset at best, but certainly not an integral part of its cavalry organization. So, like it or not, this short resume' indicates to me that the myth is alive and well despite our good intentions.

How about training? My first encounter with training and D Troop took place 3 weeks after my arrival. I found my D Troop was going to a major training area, but my squadron

was not. That had been going on for several years. We corrected the situation, but it came hard. The next training cycle found the troop deploying to the major training area before the squadron to support the division with its aviation assets, but by then the cavalry had sufficiently infiltrated the chain of command to turn the situation around when the squadron arrived on site. Thereafter, we trained together and tested together, but there was a lot of heartache with the other division elements over this new departure—no lift ships, no special combinations of gunships sometimes known as "pink teams," et al. Interestingly enough, the greatest heartache came from the Division Aviation Office—which had always been prone to task the troop—which shows that comprehension of air cavalry roles and missions is not the special province of either rated or nonrated officers.

In fact, I found at one point that the rated group were my main adversaries. About halfway through my tour, I discovered that aviation elements at higher headquarters had studied, staffed, and almost won approval of a plan to consolidate all the D Troops and the assault helicopter companies into a single battalion. Though we mounted a defense, the plan simmered for the rest of my tour, and there were various moves to redesignate D Troop and consolidate it with other aviation elements at one level or another. Can there be any doubt of the seriousness of the threat to D Troop?

The clincher to the question of who owns D Troop and what it will do was probably best brought home to me during a briefing for a rated general officer on the aerial gunnery program we were hosting. Some of our proposed approaches were geared more specifically to our air cavalry needs than to assault helicopter needs. My troop commander found himself defending this approach to the general officer, and was giving ground slowly like a good cavalryman. In the process, there was some rather sharp skirmishing about air cavalry roles and missions. The discussion ended with the general officer remarking that if we ever had to implement our war plans, he or the division commander would be telling us what to do with each and every aircraft. I did not like that particularly, but I believed him.

The point is, the myth that General Bartley alludes to is really out there. We all know the Cavalry Squadron TOE and the mission, but the reality is that we have not practiced air-ground cavalry integration to any great degree, and we possess very few rated or nonrated officers who ever saw it really function in Vietnam. That does not bode well for the future of the Squadron's D Troop. The more we think and talk about it, the more chance there is that the myth will turn into reality, enabling D Troop to fulfill its intended function in the Cavalry Squadron, instead of being converted into another gunship company. But if we cannot realize the myth, then let's admit it and reconfigure D Troop into something that a senior commander will leave alone, permitting us to count on employing it in combat as well as in training.

By the way, for the information of some of the letter writers, General Bartley knew Cavalry pretty well when he was my squadron commander in combat—not that he needs my defense

MICHAEL D. MAHLER
LTC, GS
HQ, DA

Writing a Readable OER

by Colonel John C. Baknsen Jr.

and Major R. William Highlander

The opinions expressed in the following article are those of the authors and do not reflect the position of the Department of the Army.

Ed

The impact of a single Officer's Efficiency report (OER) can propel or crush an officer's career. And, even the well-intended report can be ruinous if the rater fails to say what he means. Therefore, when an officer writes the efficiency report of another officer he is discharging an immense obligation.

No one really knows what a selection board member will single out for review when going through the records. But one realistic fact is that a board member will not scrutinize every word, every line of every report in the file—he just doesn't have the time. Rumor has it that a report is looked at from 30 seconds to a few minutes by each reviewer. The importance of writing a readable OER is obvious.

This article doesn't discuss what's good and what's bad about the personnel policies of the U.S. Army. That subject could fill a book. What it does do is point out some ways to bring a report to the attention of a reader.

The personnel selection process remains a mystery to the vast majority of the officer corps. Some say that a friend on the board equals two maximum reports. But selection board members do conscientiously perform their duty in the time available while faced with hundreds, maybe thousands of files. The authors, one of whom has served on an officers' promotion board, have tried to slice through the enigma during their careers. In addition, they have talked to personal friends who have been board members.

Why some officers are selected for promotion and others are not (except for the obviously superior and the obviously

inferior) remains elusive and undefined. But since the OER is the most important index, there is some general agreement about what makes a readable OER.

Readability, brevity, and presentation are the keys to a well-written report. Readability means sharp, descriptive phrases. Don't try to fill the entire block—enough good or bad words can be said in half the space provided. Selection board folks don't bother with extensive verbiage; they become bored rather easily with lackluster language.

For example, what more need be said about the lieutenant who was cited as "Possibly the first future Field Marshal of the U.S. Army." Nor would further description be necessary for the lieutenant who was said to be "the type of officer who will go through life pushing on doors which are marked pull."

Let's start with the first page. The rater should always indicate the frequency of observation as **DAILY**. An appraisal carries less weight if the reader thinks the supervisor has taken insufficient effort to properly supervise the subordinate. Unless the rated officer is physically separated from the rater's post and even though his performance may not be observed every day, there should be no doubt that the appraisal is based on the rater's personal and frequent observation.

In Part IV, anything other than a check in the **YES** column will make the board wonder what's wrong. For those to be awarded good comments, the blocks should look something like this.

b. RATER Explanation: Question(s) ALL

A colorful leader, a consummate professional who commands respect of superiors, peers, and subordinates alike!

Forthright, forceful, shrewd, knowledgeable. A REAL WINNER!

c. INDORSER Remarks on above questions, if desired: Question(s) 1-16

Everything this officer does exceeds, far exceeds, what any other officer of any rank has done.

He is a FIGHTER through and through.

Inflation has rendered the numerical score nearly useless as a discriminator. If such scores were to be used to differentiate between officers, a 95 could be devastating. Therefore, *numbers* count little in deciding on promotion, schooling, or assignments. *Words*, however, are important.

Writing should not be trite, filled with cliches, nor out of character for the writer or the rated officer. Most of all, the writer should present a memorable image of the rated officer—good or bad!

The following example is a bit long and, though obviously touting the rated officer, the writer appears to be a frustrated novelist.

An incomparable executive. Programed like no computer, with a sixth sense to recognize the important from the unimportant. Just what in a mass of information is pap and what is paprika? What is bland and what is hot? His extra-sensory perception helps him even to read between the lines of a person's forehead. Uses cigars for a prop; as a pointer for emphasis; or, blowing lazy smoke to stress a pause for pondering. Sizes up the psychology of a meeting, and knows when to draw a laugh or draw blood. A ruthless enemy of the superfluous, whether it's paper, words or motion. A cutter of extraneous reports. Whittler of lengthy, obscure and obfuscating paragraphs into short, clear sentences. And, shaper of zig-zag-zaney work flow, into straight line simplicity. He is star quality.

And although the imagery is good, does the description help a selection board member to determine the officer's potential?

When recommending future jobs or potential, always mention that he should (or should not) at the earliest opportunity, attend schools, be promoted, or given assignments appropriate to his grade or potential. The reviewer will be making such decisions based on what you have written about the officer. The sharp phrase is important here also. Examples might be:

"Command a combat battalion."

"Command two levels above his grade now."

"Staff officer at a training center."

Remember that the board member will probably not know the rated officer. So all he has to go on is what's there in black and white. What you meant to say might not come across that way. Perhaps the rater who stated, "This officer should have the opportunity to command a company, in another battalion," was saying this officer was a fine commander. Or perhaps he was trying to pass his problems on to someone else.

And how about the officer who "almost set an aviation safety record?" Did he demolish an aircraft? The perception

and background of the reader might cause a misinterpretation of the report which stated "I know of no other officer in the Army who is as well qualified to command a reception station."

The writer should take care to proof his writing for grammar, inadvertent omissions, and possible misinterpretation. A reader might suspect the rater who wrote: "His morals and mental standards are above reproach. I have advised him of this weakness and he has attempted to correct it."

Don't fill up the block with inane or inconsequential information. The idiocy of what can happen is the rater who said "The rated officer is tall, slender, small boned with thin black hair." The comment of the indorser was of little help in making an important decision about the officer's career. He endorsed the report: "In general, I concur with the rating officer, however the captain is more average height than tall."

Why would any rater take up space by writing: "Major _____ is of slender build, average height, good bearing, has receding hair and keeps unusually long fingernails."

Even though a picture of the officer is required to be in the file, many raters think it necessary to comment on an officer's physique. Here's a few of such comments:

"This officer is a gourmet cook and shows it."

"He fights fat in administration, property, and flesh."

"His short and unusually powerful build makes it difficult to determine how much he is overweight."

Those who have weight problems might be fortunate to be rated by the officer who said:

"It is my opinion his height/weight ratio is unnecessarily belabored. This young man exudes a vitality which bespeaks exuberant good health, high energy and the capacity for hard work. I might add that this has been somewhat more enthusiastically demonstrated by him than by most of his thinner peers. His appearance is well within acceptable standards. All undue emphasis upon such prissy measures of worth would have deprived the United Kingdom of Winston S. Churchill."

Although performance is the most important factor of a job rating, image also plays a part. After all, that's what we are talking about—the visual picture of the rated officer. And we relay that mental image by crisp descriptives and presentation techniques. Similar to Part IV examples, the comments in Part VII are critical.

To make the narrative jump out at the reader, use wide margins, spacing between phrases or sentences, underlining, or capitalization. I term the following as good examples of a readable OER

4. RATER Narrative evaluation is mandatory.

CPT Lewis is A REAL STUD!

This officer is unflappable. He is cool, smart, and always gets the job done.

He has made more impact on this unit's readiness than any other soldier--A PROFESSIONAL!

Promote him now. Give him the opportunity and he will be a general.

MAJ Stonor is a TRULY OUTSTANDING PERFORMER

He's tough, demanding of excellence. Troops respect him and would follow him anywhere.

Send him to CGSC NOW, and put him in a command slot at every opportunity. He's STAR quality.

Of course, the same techniques can be used to slam an inferior officer. And if you can say only average things about an average officer, make it stand out in the reader's mind.

Writing an OER is not a light task. The impact of your words can help or hurt critical decisions about a soldier's career. Say what you mean, make the reader remember it

Bits & Pieces Gleaned From OERs

If you were a board member, how would you interpret these comments?

Sharp! Smart, quick thinking and thorough. Good sense of timing. Plans ahead. Tactful but not awed by rank. Understands troops. **PROMOTE HIM!** Then program him for command, civilian school, military school and high staff.

A flawless performer. Mature beyond his years. He has the potential for service as a general officer. Assign and school him carefully.

LT _____ is a clean cut, well educated bachelor who is careful to insure that his military activities do not interfere with his numerous social responsibilities.

LT _____ is an individual who attempts to complete his assigned tasks in a satisfactory manner, however, his perennial cogitate engrossment in one area causes dissonance in all other areas.

He has a listening problem, he only hears what he wants to hear. The selective listening syndrome.

The officer willingly accepts responsibility for the actions of his subordinates, however, the subordinates continue to make the same efforts.

He stood out among the handpicked elite in the headshed.

He does best those things that require judgment.

With no qualifications he is an exceptional officer.

Rated officer was assigned to TV 8.1.3. in the Fishbowl operation.

Battalion P.O. for Cinchner Mobilizer.

He's a cigar chomping, computer headed, straight talking, manful and altogether remarkable officer who wastes no time on palaver. No nonsense, keep cool case in which he handles crisis.

When given a task he attacked it with the vigor and courage of a gladiator.

Division Artillery infusion officer.

One Line Endorsement: "He would put a cutting edge on a marshmallow."

He was unresponsive in community affairs and fund drives. In one instance, he gave a one cent contribution coupled with a biblical expression which, however correct, was viewed as being more detrimental to the program than helpful.

From Vietnam, Commander speaks of his deputy. "Brick, assured and cool as a gunfighter. He has a knack of making a point without making an enemy—makes me feel like King Arthur. He's Merlin. Not only a wise and fearless counselor but a magician. A born commander. He cuts sham, breeds confidence. Has a way with the men in the grand style of the professional soldier. Makes them chuckle as they charge.

He would make a fine officer in the French Foreign Legion.

It is recommended that upon his return from overseas he be given a command job. He is probably better suited for a staff job.

Although he abstains from alcohol he is well liked socially.

Playing around with his command policies is like playing Russian roulette with a bazooka.

I urgently recommend his retirement at the earliest convenience to cut back the financial loss the government is suffering every day he is on active duty.

Here is an unusual officer, he reads books

An Antiaircraft Tank

Tankers, picture this scene: A column of heavily camouflaged main battle tanks races down a Western European road while reacting to a fluid battle situation. On the flanks of the tank column, antiaircraft vehicles trace nervous arcs with their 20-mm guns in hopes of warding off aerial attackers.

Suddenly a pair of attack aircraft thunder down the column, catching the radarless antiaircraft crews by surprise. The aircraft rake the tanks with cannon and rocket fire and then depart, unscathed.

Nightmarish, isn't it? Yet this kind of scene was the daily fare of German Wehrmacht tank crews as they vainly maneuvered to counter the D-Day invasion. Outnumbered on the ground and almost totally without antiaircraft defenses, the German armored divisions in France were mauled during the day by Allied tactical aircraft and were only able to move with a degree of safety during the night.

The German Army was forced to develop an "air-defense consciousness" in early 1944, and all of the antiaircraft tanks they fielded were hastily conceived designs based primarily on the *PzKpfw IV* medium tank. By the end of the war, potentially effective, purpose-built antiaircraft tanks were on the drawing boards, but the war ended before their introduction.

What I have labelled "air-defense consciousness" is readily definable. It is merely the recognition of an enemy air threat to ground forces and the development of a weapons system/tactics package calculated to meet such a threat. Purpose-built antiaircraft tanks like the West German *Gepard*, the antiaircraft version of the *AMX-13*, the Soviet *ZSU 57/2* (though dated) and *ZSU 23/4* are evidence that these armies have not forgotten the bitterly learned air-defense lessons of World War II.

And what of the U.S. Army? How well developed is our air-defense consciousness, and where is deficient? This question is the basis for this article, and it is a question to which more Armor personnel should direct their attention.

During the second World War, American ground forces really only faced a viable air threat during the North African campaign. As a result of this, motorized gun carriages (based on the *M-3* halftrack) were developed. Mounting a weapons mix of either .50 caliber machineguns, or 37- or 40-mm cannon, these lightly armored vehicles served well enough through the war, being useful against ground targets as well as the waning Axis airpower. As the war continued, Allied air superiority became virtually complete, and interest in antiaircraft defense for ground units faded. A number of experimental antiaircraft vehicles based on the *M-3* halftrack and the *M-24 Chaffee* light tank chassis were developed, but never fielded.

The belief in the effectiveness of American air power was reinforced during the 1950's, especially after the Korean

War. During this period, the *M-42 Duster* was developed. Armed with twin 40-mm guns, the *Duster*, which is based on the *M-41 Walker Bulldog* light tank, soldiers on today. Its lack of crew protection and radar plus its slow rate of fire have become increasingly heavy liabilities in recent years.

The increasing obsolescence of the *M-42* system was recognized in the late 1960's with the advent of the *Vulcan* and *Chapparat* antiaircraft vehicles. The *Vulcan* is a standard *M-113* armored personnel carrier armed with a 20-mm aircraft cannon. The *Chapparat* consists of four *Sidewinder* missiles mounted on an FMC chassis. The missiles are hand-loaded by unprotected personnel.

Let us analyze these systems. Both are based on a relatively mobile, lightly armored chassis. Both vehicles are armed with weapons systems developed for use on aircraft. On both the *Vulcan* and the *Chapparat*, the gunner has little or no overhead protection. These qualities, coupled with the rapidity with which these vehicles' ordnance can be expended, makes them somewhat less than ideal antiaircraft weapons. This is not to suggest that the *Vulcan* and *Chapparat* are of no use, but rather that they should fulfill an interim role in the development of a fully capable antiaircraft tank.

Why is this a good time to be talking about antiaircraft tanks? There are two main reasons: First, the U.S. Army has never had an antiaircraft tank. Second, the U.S. Army badly needs an antiaircraft tank. I stress the word *tank* because, with the development of the *XM-1* main battle tank, Armor has the potential to field a powerful and effective antiaircraft tank, a vehicle whose automotive attributes and protection would allow it to operate on a battlefield as intense as that on which the main battle tank could be expected to operate. In the past, the U.S. Army has used the chassis of its main battle tanks for engineer vehicles, for recovery vehicles and for mobile assault bridges—yet an antiaircraft tank has been conspicuously absent.

There are numerous forms which our antiaircraft tank could take. Although it is not the intention of this dissertation to present a polished design for such a vehicle, such items as a well-shaped turret, a good radar and an auxiliary fiber-optics sight system, and an automatic weapon in the 20- to 35-mm caliber seem likely for inclusion in a modern antiaircraft tank.

In conclusion, the pressing need for a smoothly functioning combined-arms team, which can win the battles of the next war at adverse odds, demands as one of its components a mobile and deadly air-defense system, and there is no reason why the *XM-1* should not carry such a system.

Robert E. Stone
Univ. of Michigan



oh! how the horses laughed!

FORT D. A. RUSSELL, TEXAS

December 2, 1930

SUBJECT: Report on Transportation of the 2d Platoon, Troop
"E" 1st Cavalry, to Fort Clark, Texas and Return.

TO: The Commanding Officer, Fort D. A. Russell, Texas.

1. Following is a detailed account of the trip from

Fort D. A. Russell to Fort Clark and return which was made during the month of November.

2. On the night of 7 November 1930, six Class B Horse trucks, two Class B baggage trucks and one Class B tanker were spotted in the rear of the "E" Troop barracks. All the trucks were running well and were expected to get an early start and make a short run to Sanderson, our prospective first camp.

During the night a light rain fell, but it was thought that this would cause no trouble and the next morning at 6 a.m. we started to load. Due to the fact that the horses were unaccustomed to being loaded in trucks, a great deal of difficulty was encountered, but after an hour and a half, everything was in readiness and we started. From that minute until we arrived at Fort Clark, five days later, our lives were just one trouble after another.

Before the last truck had cleared the post, one truck had locked in gear, necessitating a halt of 20 minutes to make repairs. This being repaired, we set forth once more only to find the two leading trucks stuck in the mud not more than 200 yards from the gate. Twenty minutes more were consumed in getting them out and on the way again.

From there on, everything went well until we were six miles west of Marathon where it was necessary to gas the trucks and eat. Forty-five minutes were consumed doing this, but 1 o'clock saw us on our way and only 70 miles from our campsite.

But trouble was close upon our heels, and we had not covered ten miles when the rear end went out on one of the trucks, rendering it helpless and necessitating using a good truck to tow it. Another five miles and the carburetor and intake manifold dropped off a truck. We stripped the necessary parts from the crippled truck and once more continued, this time to the end of the pavement 13 miles east of Marathon. By this time I had decided that it would be impossible to reach Sanderson, so Lieutenant Berry went ahead to pick out a campsite nearer to us. He took the G.M.C. truck with the rations and cook ahead with him.

We progressed about 5 miles into the mud east of the end of the pavement without mishap. Then the truck which was being towed went into the ditch and became stuck, stuck so fast that it was impossible to get it out without endangering the other trucks. As night was fast approaching and we were still 16 miles from our camp, I gave orders to leave the truck and continue the march. At this point, an epidemic of stopped gas lines struck the train and at least six halts had to be made to repair these troubles. But we kept on moving in low and second gear some hours making 2 miles and some only one, until 9:30. Then two more trucks went dead and the mud was so deep that the live ones could not tow the dead ones. I decided we must halt even though we were still 8 miles from

camp. We stretched tow chains between the trucks for a pick-et line, unloaded the horses, fed them, and, since the only water available was in the mud holes, we watered them there. In the meantime, I went into camp and sent the G.M.C. out with food for the men. This done at 11:30. The men camped beside the road and I took two men back to the abandoned truck to ride the horses from it in bareback. After this, Lieutenant Berry and I had a brief council of war and reached the conclusion that we could not go farther without aid from Marfa, so he went for help and I went back to camp to get more food ready for morning. Before daylight, I brought this food out to the men and at once we started moving the trucks and horses the remaining 8 miles to camp. This consumed all the morning.

Since we had contemplated only a one-day trip, we had but two and one-half days rations and forage, and this was already low. Also the trucks were all in bad shape; consequently, I decided to stay here and get ready to move on as soon as the help came from Marfa.

The relief expedition also encountered difficulties and did not arrive until well after dark. We then exchanged two dead trucks for their live ones, changed a horse body from one of our trucks to one of theirs, reloaded our baggage, rations and forage, took over the supplies brought from Marfa and tried to sleep. But it was raining so much that there wasn't a dry spot and sleeping was out of the question. The result was several small fires with groups of shivering men huddled around them discussing the possibilities of ever getting back to Marfa again.

We were all ready to go the next morning at daylight and go we did, about one mile. At this point we struck ten miles of road which I'm sure will always cause a shudder in every man who crossed it that day as long as he lives to remember it. It was a newly built road with a bottom of sand and a 10-inch surface of the slipperiest mud I have ever seen. It took us 10 hours to cross that 10 miles and we had to shovel, pick and pull every inch of it. In some places where the trucks would sink in to the body, it was necessary to dig all around them, jack them up and build a road of stones, brush and boards underneath. This same process had to be repeated for nearly every truck that crossed each hole, for the roads we built, though better than the ones we were traveling on, were none too substantial. Finally, at 7:30, we reached the pavement 11 miles west of Sanderson and from there to Dryden we travelled with but one breakdown. One of the trucks blew out a cylinder head 4 miles west of Dryden and it had to be towed in.

At this point, Sergeant Stutz came to me with the news that we were out of gasoline. This seemed impossible for we had left Marfa with 980 gallons, but a check soon proved that we were indeed out. But Dryden has an airdrome and airdromes always have gasoline so we soon had three drums. Camp this night was quite comfortable because we

were permitted to sleep in the hangar, out of the rain and wind.

Tuesday, the fourth day out, we proceeded on slowly but steadily with only an occasional breakdown and without getting stuck until 8:30 p.m. when we encountered a treacherous detour 6 miles west of Shumola. Lieutenant Berry had gone on to Fort Clark for more gas and rations, I had sent the G.M.C. to Shumola to make camp and there was no possible chance to camp near this detour, so we had to try to cross it, even though I felt certain that it could not be accomplished. At this time we were towing two dead trucks which proved a great hindrance. However, we tried it and the first two trucks got through. Then came two live trucks towing a dead one and down they went into the mud, stuck hard and fast in the bottom of a gully where the sides were too steep to go forward or backward. After working for two hours it became apparent that we never would get out of this hole under our own power. It also became necessary that we get out somehow because cars were filling the road for many yards on each side waiting for us to get out so they could pass. At this moment, a lifesaver in the form of a highway man came to our rescue with the good news that he had a tractor which would pull us out. He went for it and soon returned. It was just a matter of minutes from then until we were out for that tractor walked through the mud and up the hill with 2 or 3 Liberty trucks fully loaded as easily as if it had no load at all. It seemed now that our troubles were lightened, but fate still had some bad news in store for us. We hadn't proceeded a half-mile before two trucks got stuck and while attempting to pull one out a third went in the same hole. There was nothing to do but unload. The men rode the horses in to Shumola bareback and Sergeant Stutz, his drivers, and myself stayed to get the trucks out. After excavating about 50 yards of road we got them all on solid ground and this time made our camp at about 1:30 a.m. There we found rations, forage and 110 gallons of gasoline from Fort Clark.

On Wednesday morning, we started out with both the Pecos and Devil's rivers to cross and only 110 gallons of gasoline. We knew that this much gas would only take us a short distance so Lieutenant Berry left at once for Fort Clark for more. Meanwhile, we crossed the Pecos Canyon without mishap and were on our way to Comstock. About 5 miles west of Comstock, we again ran out of gas, but inside of ten minutes from the time we halted, a tanker came out from Del Rio with 430 gallons which sufficed to complete the trip. From this point on in to Fort Clark we had one broken connecting rod which necessitated towing another truck. Aside from this trouble, the remainder of the journey was comparatively uneventful and we arrived at Fort Clark at 10:00 p.m. 12 November, just five days after we had left Marfa.

On the trip we used 1,670 gallons of gasoline, 90 gallons of oil, 3 trucks were out of action and nearly stripped

to replace parts on the ones which were running; all our tow chains were broken; the whole train was in bad condition and parts were missing from every truck. The men and horses suffered a great deal from exposure and irregular meals, but two days rest put everything back in fairly good shape. Nearly all our clothes were almost ruined from the mud.

The return trip was much easier for the roads were dry nearly all the way. Of course, there was continual motor trouble and, even with the good going that we had, it was necessary to tow 3 trucks into Marfa. One of them with a broken cylinder head had to be towed all the way from Del Rio. However, in spite of all this trouble, we made 95 miles a day and the third day out from Clark saw us safely home.

3. In my opinion, the transportation of Cavalry by Liberty trucks is not only impracticable, but a waste of time in any weather. In wet weather it is impossible. These trucks are so old and worn out that the strain caused by pulling heavy loads over long distances is too much for them. On good roads and for short distances, this means of transportation might prove valuable. The bodies are excellent for this purpose. They are large enough to accommodate 5 horses without crowding and the tailgates made in the form of a collapsible ramp make loading and unloading easy. But until there are some good dependable trucks under these bodies, I would much prefer to do my future marching as it should be, on the back of a horse.

Samuel L. Myers

Samuel L. Myers
2nd.Lieut.1st Cavalry



LTG SAMUEL L. MYERS enlisted in the 101st Cavalry in 1923. A year later, he entered West Point and graduated in 1928. Following 9 years with the 1st Cavalry Division in the 1st, 5th, and 12th Cavalry Regiments, he commanded F Troop, 26th Cavalry, Philippine Scouts.

During World War II, General Myers served as Deputy Chief of Staff, Operations for Generals Patton and Bradley in II Corps, Africa and Sicily. He also served under Generals Bradley and Hodges in the same capacity in the First Army, European and Pacific Theaters.

General Myers commanded the 3d Armored Cavalry Regiment from 1949-51, was Chief of Staff of III Corps from 1951-52, and served as Deputy Commanding General of the 3d Armored Division, Fort Knox, from 1954-55. In 1955-56, General Myers commanded the Armored Training Center, Fort Knox. He was Assistant Deputy Chief of Staff, Logistics, Washington, D.C., from 1956-1958. From 1958-61, he was Chief of Army Section, MAAG, Vietnam. General Myers returned briefly to CONUS to command the U.S. Army Armor Center and Fort Knox in 1961. Later in 1961, he served as Deputy Commanding General of the Eighth Army, Korea, where he remained until his retirement in 1963 after 40 years of service.

Pages from the Past

DISTINGUISHING CHARACTERISTICS

Two qualities distinguish the soldier from the civilian.

They are, virtually, secrets of the military fraternity, although they have been repeatedly discussed and analyzed in public. They remain secrets, however, because rare indeed is the civilian who ever acquires the slightest understanding of what the soldier means when he talks about them.

They are the twin essentials of success in war. Without them no leader can expect to win more than a transitory victory. They must permeate his entire organization, regardless of its size.

They are organization and discipline, or rather military organization and military discipline.

The Cavalry Journal
July-August 1945

MORALE

The American soldier responds to leadership which appeals to his pride in himself and his organization. The officer must, therefore, make every effort to build up the pride and self-respect of the men by laying emphasis on the proud traditions of the soldier in general and of their organization in particular. Good morale, on the other hand, is indicated by a positive drive on the part of the men; a push beyond that which is expected; an eagerness and enthusiasm concerning the leader's desires. The men must never be allowed to forget that they carry the badge of their unit and their country, and that those who see them regard them not as individuals, but as representatives of the unit whose insignia they wear. If they appear smart, alert, and efficient, the comment will be not so much "that is a good soldier" as, "that is a good outfit."

The Cavalry Journal
July-August 1945

PRIDE

"You would have enjoyed the sight of one of our troops returning from patrol today. I had last seen this troop 3 weeks ago, after it had been out for 2 days. On that occasion the jungle was thick, it was raining in buckets, and the mud was knee deep. The troopers were carrying 4 days' rations and their ammunition. They had nothing but a poncho, wool-knit sweater, and toilet articles with them in the way of comforts—but, their morale was high, and there wasn't a sour face nor a grumble in the entire outfit.

"Yesterday they came off the south end of Manus Island at the end of their 3-weeks' patrol.

"The first glimpse I got of the troop, it was coming down the Lukuli River in native canoes. Never in the world was there a more picturesque sight. Of all the rough, tough, muddy, ragged troops you ever saw, they were it. Yet you have never seen a more cheerful, enthusiastic, happy bunch of men anywhere. Nor was there a set of whiskers among them; nor a rusty weapon. They were as happy as though they were headed for Coney Island. Every one of them had a grin on his face. Anyone seeing them could not fail to notice that each man had achieved one of the most valuable of military qualities—pride in himself and his troop."

Commanding General
2d Cavalry Brigade
The Cavalry Journal
March-April 1945

MORAL SUPPORT

When life is reduced to a common denominator by just the whirl of a hostile bullet, man is singularly unimpressed, unmoved by words or promises. He demands something more—something solid, something concrete; a knowledge that the power and might of a great nation are behind his every move.

The Cavalry Journal
March-April 1945





With the advent of the 3,000-meter antitank weapon and the oft-repeated lessons of the 1973 Mideast conflict, it has become fashionable to talk about such things as "strong point" defense, little or no armor reserves, and deciding the entire issue along the FEBA, or at least in the FDA. The reason most often given for this type of defense is that NATO is facing vastly superior armored forces with good air cover and that, against such a force, mobile reserves count for little. However, it is precisely this type of force that the German Army faced during the later years of World War II on their eastern front and, in many cases, defeated successfully, using the advantages of superior training, terrain, decentralized command, and the combined-arms concept.

The Action At Facuti (Preliminaries)

General Situation. (See map 1) The action at Facuti was part of the battle of Targul Frumos, which was fought in April and May 1944 in northern Rumania by the panzer-grenadier division "Grossdeutschland" (GD). The division faced massed Russian armor, whose main tank was the *Stalin I* mounting the 122-mm gun. This gun had an effective range of 3,000 meters compared to the German tank gun range of 750 meters. While units of the GD Division held the FEBA north of Facuti, the Army reserve, the 24th Panzer Division, had been placed behind the right wing of

the GD Division with the mission of holding itself ready to destroy any penetration that might occur in the sector of the GD Division.

Special Situation. (See map 2) One regiment of the GD had the mission of defending the high ground north of Facuti between Hills 192 and 180, and above all, to deny the enemy passage through Facuti to the open area and major east-west thoroughfare to the south. The regimental commander, therefore, dispersed two of his battalions along the high ground to the north, and kept the third battalion in Facuti, both as a reserve and to prepare a strong blocking position in that town.

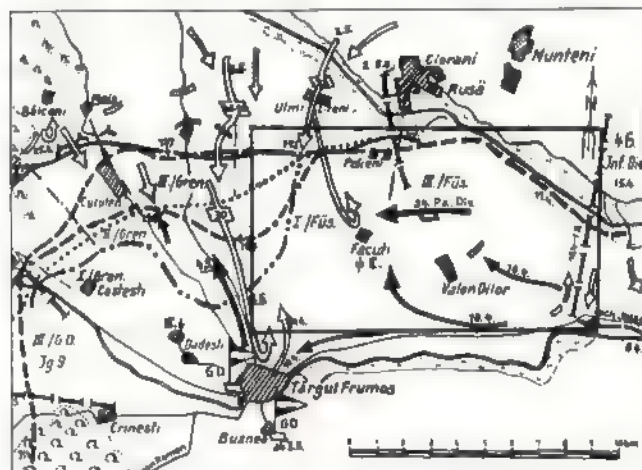
Concurrently, the 24th Panzer Division was moved into the vicinity of Sarca and assigned the mission mentioned above. The division, therefore, established liaison with various GD Division units and started to reconnoiter possible attack routes. In furtherance of his mission, the division commander organized two combat groups as follows:

Combat Group E

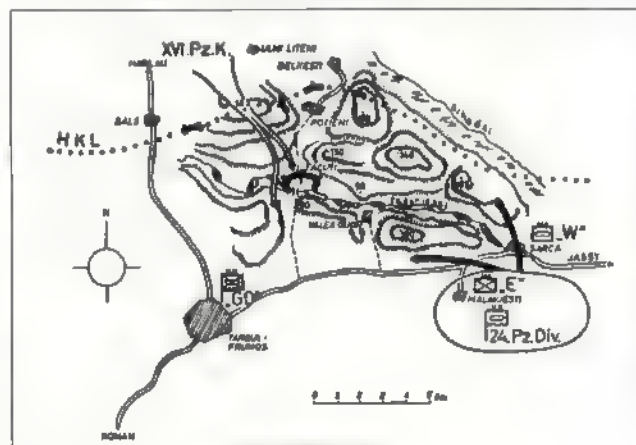
- Two motorized *panzer grenadier* battalions
- One motorized panzer artillery battalion

Combat Group W

- Headquarters (including three 75-mm antitank guns, three 150-mm assault guns, and nine 20-mm AA guns).
- One panzer battalion (consisting of 14 *Mark IV*'s with



Map 1



Map 2

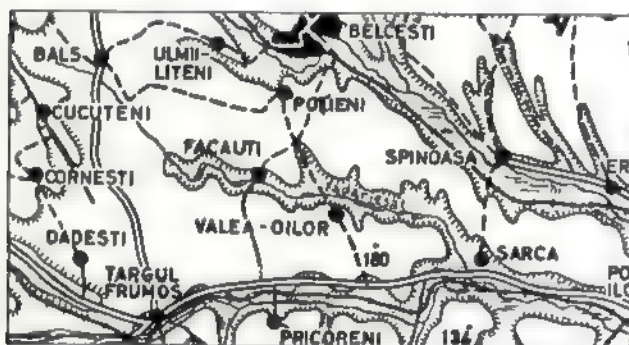
75-mm guns and nine assault guns, 75-mm).

- One *panzer grenadier* battalion (consisting of 18 armed armored personnel fighting vehicles, eight 75-mm guns and one engineer platoon)

- One cavalry squadron (consisting of 22 APC's, one truck-mounted company, seven 75-mm guns, three 81-mm mortars and one engineer platoon).

- One panzer artillery battalion (consisting of one battery of 150-mm howitzers and one battery of 150-mm assault guns).

Personnel, Equipment, and Logistics. The units of the combat groups were at 60 percent strength, and officered by young, but battlewise, officers. The GD regiments, however, had received a goodly amount of green replacements. Equipment-wise, the combat groups had only 25 percent of their authorized vehicles and most battalions were at company strength. Because of APC losses, half of the infantry had to be transported in unarmored trucks. Nevertheless, each company in the panzer-grenadier battalions had its own medium mortar and two heavy machineguns. Communication equipment was such that communications between group and the battalions could be maintained continuously, but only seldom between battalion and the companies. Overall, morale was good and necessary perishable supplies were not lacking.



Map 3

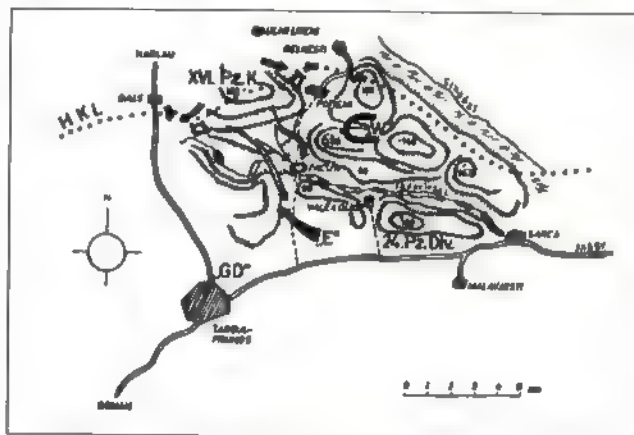
Terrain and Weather. (See map 3) The area of operation was not ideal for armor employment due to the rough terrain. The area west of Sarca is compartmented by a depression running due west to Targul Frumos and another running northwest to Facuti. Paralleling the Facuti depression on the north and south are two fingers of higher ground which themselves are compartmented by small masses of hills. Due to lack of roads, movement between Sarca and Potieni was extremely difficult, and was aggravated by the fact that several days of rain had made the ground very soft. The terrain is further characterized by open spaces with intermittent clumps of trees.

Air Situation. Although the Soviets did not have air superiority, strong air attacks were expected. The 24th Panzer Division was not assigned tactical air support of any kind, and any request for such had to be approved by Army HQ. The division, therefore, had to rely on its own anti-aircraft assets for air protection.

The Action

Initial Situation. (See map 4) During the morning of 2 May 1944, the Soviets launched their expected attack, sup-

ported by heavy artillery barrages, and broke through the GD Division units on Hill 192. The 24th Panzer Division was immediately ordered to counterattack and restore the FEBA, but it was left to the division commander as to how



Map 4

he wanted to accomplish this task. A frontal attack from the south across the Facuti depression to Hill 192 was ruled out, because the German command knew from experience that Soviet doctrine called for the establishment of a strong anti-tank position on Hill 192 once it had been completely cleared. The sloping terrain from Hill 192 to Facuti, added to the chokepoint at Facuti through which the German counter attack would have to be launched, made the frontal attack almost suicidal. It was decided, therefore, to use the unarmored Combat Group E to blunt the nose of the enemy at Facuti, while the armored Combat Group W hit the long exposed Soviet flank between Hill 192 and Facuti. Orders to that effect were then issued.

Orders of Combat Group W. Since time had permitted a reconnaissance only to Hill 148 and since the situation to the northwest of Hill 148 was unclear, the Group W commander decided to lead with the panzer battalion and issued the following order by radio:

"Enemy has broken through at Hill 192 and is moving south.

"Division is to destroy the enemy south or north of the Facuti depression. Combat Group E attacks Facuti from the south. Combat Group W has the mission of attacking the flank of the enemy and restoring the FEBA at Hill 192.

"Combat Group W will leave Sarca and march in a northerly direction over Hill 162 to Hill 148. Order of march: panzer battalion, cavalry squadron, flak company, headquarters, panzer-grenadier battalion, assault gun company, artillery battalion. Time: immediately.

"Logistic units to remain in Sarca.

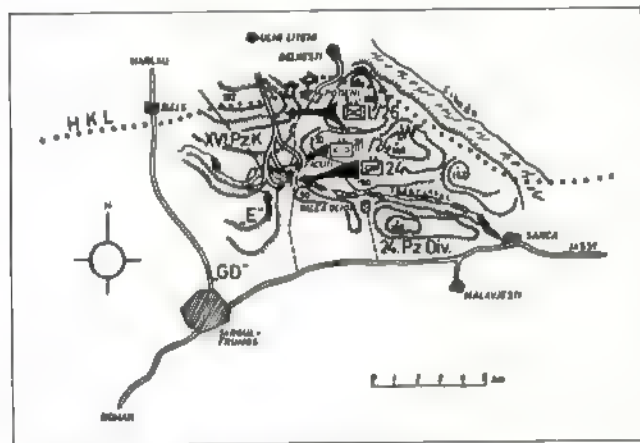
"I will be with the panzer battalion."

Approach March. The group commander ordered a platoon of panzers to advance rapidly to Hill 148 to secure that hill. He was forced to do this because the swamps and hilly ground slowed down all vehicles, with the exception of the panzers. A slight traffic jam in Sarca further slowed some of the units of the group. The self-propelled flak company moved by bounds so that it could at all times protect the column against enemy air. At 1100, 3 hours after it had been alerted, the group reached Hill 148. Here the commander

was informed by division that GD Division units still held Facuti and some surrounding terrain and that group E was fighting enemy infantry that had crossed the depression west of Facuti. The following orders were, therefore, issued:

- A panzer platoon to advance to Hill 130 to determine the situation.
- Several infantry platoons to provide all-around security.
- Other units to be prepared to move either on Hill 192 or Facuti.

Shortly thereafter the panzer platoon reported from Hill 130 that 30 to 40 enemy tanks could be seen around Facuti and that fighting was still going on within the town and on Hill 192.



Map 5

The Attack. (See map 5) Since the enemy tanks around Facuti did not seem to be aware of Group W and since the GD Division's infantry on Hill 192 was still offering resistance to the Soviet second echelon, the group commander decided on a surprise attack to hit the enemy from the flank and the rear. The panzer battalion, therefore, received orders to destroy the enemy tanks around Facuti, and was to be supported by the cavalry squadron. The panzer-grenadier battalion received orders to protect the right flank of this thrust and to establish communications with any German units found in the vicinity of Potieni. The artillery was to support the panzer-grenadier battalion, since the expected intermingling of Soviet, GD Division and Group W units in Facuti did not warrant its employment at that location. The flak company was to support from Hill 130.

With the group commander in its midst, the panzer battalion closed the range undetected until its guns could achieve a good kill probability, and then opened controlled, concentrated fire. Within minutes, 11 *Stalin* I's were aflame, several more received mobility kills, and the rest were destroyed by the accompanying cavalry squadron. Thereafter, in conjunction with the GD Division's unit in Facuti, the German *panzer jaeger* of the cavalry squadron destroyed the remaining Soviets in and around Facuti.

To the north, the *panzer grenadier* battalion had established contact with friendly units in Potieni, had absorbed the German infantry that had, in the meantime, been kicked off of Hill 192, and then placed such a heavy concentration of direct and indirect fire on Hill 192 that the Soviets were unable to establish the expected antitank position. Both the units of the 24th Panzer Division and the GD Division

thereupon launched a well coordinated attack on Hill 192 and restored the original FEBA. By noon of 2 May 1944, 4 hours after Group W had been alerted, the penetration had been sealed off and the Soviet unit in the penetration destroyed.

Results. With these type of actions, the Germans were successful in blunting the Soviet drive for the Ploesti oil fields in April-May 1944, and in shattering several Soviet armored formations. The Battle of Targul Frumos cost the Russians 350 of their *Stalin* tanks, compared to 10 German tanks lost.

Conclusions

Although the action at Facuti was only a small part of the overall Battle of Targul Frumos, it nevertheless typifies the "fire brigade" character of the entire battle. The simplistic orders of the group commander, the use of terrain to approach the Soviet flank undetected, the quick reaction of the German command, and the excellent use of the combined-arms team are but a few of the lessons that can be drawn from this action. Although not having air superiority, and even though being faced by a superior force with longer range weapons, the German command nevertheless relied on well-trained infantry occupying blocking positions, and mobile armor reserves to blunt and destroy armor penetrations.

Defensive doctrine developers must remember that flexibility, mobility and the proper use of the combined-arms concept are necessary ingredients of any defensive concept. Strong point defense, for example, when manned by well-trained infantry that can attrite enemy armor formations and is willing to be bypassed, could be a viable doctrine, but only when backed by equally well-trained and well-led mobile armor reserves. The infantry must have the confidence that its possible encirclement is only temporary and that it will, within a short period of time, be relieved. A better alternative, however, is to negate the possibility of encirclement by maintaining a completely mobile force, which would be committed to battle only when the enemy's main thrust has been definitely located by any available reconnaissance means. This technique, however, calls for superior staff work, commanders who are flexible of thought, and mission-type, simplistic orders. Our armor leaders, therefore, must continue to be trained with that thought in mind.



MAJ HANS O. WAGNER was commissioned in Armor upon graduation from the United States Military Academy in 1961. He has served with armor units in Europe and Vietnam, and was assigned as project officer on the Tank/Antitank Assault Weapons Systems Study of the Armor Agency, CDC. A CGSC graduate, Major Wagner is presently serving in the Office of the Deputy Chief of Staff, Logistics, Department of the Army.

Bringing the Battlefield To Class

by Major Donald L. Cummings

Over the past several years, articles in *ARMOR* and other professional journals have stressed the need to emphasize fundamental combat techniques. The importance of making the terrain work for us, training programs that resemble combat conditions, and the necessity for using the concept of combined arms, rather than merely espousing it, have enjoyed a renaissance.

It appears that we have begun to evaluate the quality of the product of our training efforts rather than the process of our training. No longer do we assume that an officer or enlisted man is well-trained simply because the quality of our seemingly endless types of training aids is high, or that the ordeal that service school instructors must endure before presenting classes is rigorous.

There are three tasks that confront all teachers who have the responsibility of preparing aspirants for careers in all professions. The first is technical competence, which needs little elaboration. The second is the necessity of transferring a sense of purpose to the student. Technical skills measured by academic tests have little value in establishing competence unless trainees appreciate the practical applicability of those skills. The "hands-on" training concept has made a great contribution to overcoming this obstacle.

The third task is the transferral of a sense of urgency to the student, a task that goes hand-in-hand with the renewed emphasis on fundamentals of combat. All who have experienced combat know the effects of imprecision, technical incompetence, and weak personal traits. To the uninitiated, battlefield pandemonium can only be guessed at. To be effective, the demands on a battlefield leader must, at least in part, be known beforehand. If we expect to win the "First Battle," then the battlefield cannot be the place where the rigors of combat are first learned. Spontaneous patriotism cannot overcome the effects of poor or incomplete preparation.

Those of us in ROTC assignments are constantly asked "What is combat like?" The unknown intrigues us. The war stories of instructors in AOB raised many drooping eyelids. On the other hand, Vietnam tales and situations in AOAC were met with the classic rejoinder, "That wasn't the way my unit did it!" Yet, personal experiences of allied officers in AOAC produced a response similar to that in AOB students. Developing this sense of urgency, or a feeling for what combat is like, in the student is essential.

Although SCOPES and REALTRAIN are valuable aids in developing realistic training conditions, the costs in terms of time, fuel, and equipment wear-and-tear demand supplemental training methods to insure that leaders who are preparing for small unit fighting can maintain their ability to function under stress. One economical method has been developed by the Armor Branch of the ROTC detachment at the Virginia Military Institute (VMI).

It is a simulation game involving the following equipment:

- Sandtable, 5 ft. x 8 ft.
- Tank vision blocks
- Model tanks and APC's
- AN/VRC-12 and AN/PRC-77 radios
- CVC helmets
- Model buildings and shrubbery
- Cotton balls

The "Tanker's Game" has evolved over several years of effort involving members of the Armor Branch and cadets interested in gaming techniques. In its present form, it has overcome problems usually associated with all simulation games: first, complicated rules that demand too much concentration on the process of the game rather than on the teaching points that the game is supposed to demonstrate. The second problem is one of specifying game objectives. The primary purpose of this game is to expose Armor cadets to some of the demands made on a tank platoon leader in a combat situation. The "whys" of technical competence in map reading, radio-telephone procedure, reconnaissance, fire commands, operations orders, reports, combat support, and combat service support are vividly demonstrated. The game has also made it possible for all students to benefit from the training, rather than just those in decision making positions.

Organization of the Game

A combat situation involving the deployment of a company/team is conceived and reproduced on the sandtable after which buildings, shrubbery, and other realistic terrain features and man-made objects are added. Next, model tanks and APC's with bumper numbers affixed to the rear of the vehicles are put in place. Tank vision blocks are secured to ends of the sandtable so that the terrain will appear as if it were being viewed from a buttoned up tank. The table is then screened so that the participants are forced to use the vision blocks. All participants wear CVC helmets attached to AN/PRC-77 radios so that all communications are electronic. Deliberately inaccurate sketch maps of the play area are distributed to the players in an effort to simulate the use of out-of-date maps, but primarily to compel alertness in the student. Participants play the roles of platoon leaders, platoon sergeants, team commander, and team executive officer.

Controllers

Instructors serve as controllers. The chief controller doubles as the task force commander. The remaining three work behind the screen and each is assigned to a platoon of the team. These controllers communicate with their respective platoon leaders/players and physically move vehicles on the sandtable according to instructions. The controllers also place cotton balls simulating tank gun, artillery, and air strike bursts. Controllers monitor the progress of the game with the aid of speakers attached to an *AN/VRC-12* radio set.

Game Rules

For the participants, there are only two rules. First, vehicle movement is restricted to 12 inches in any direction at any one time. The second rule involves firing engagements. Players, although serving as primary platoon decision-makers, revert to the role of individual tank commanders when firing their tanks. They must issue proper initial fire commands (IFC), including correct ammunition. When this is done, dice are rolled. If the IFC was completely correct, there is a 50 percent chance of a target hit. If the IFC or ammunition element was incorrect, the probability of a hit is reduced to 1 in 12. In addition, once the IFC is issued, the player must indicate to the controller the actual location of the target. Once the dice are rolled, the controller indicates a hit or miss.

For the controllers, there is only one rule. They must use a vision block at the enemy's end of the table to engage friendly tanks. In other words, both sides must have a legitimate shot at the other as dictated by the terrain.

Game Play

A day prior to the actual play, the students are assigned to their groups and positions, and then briefed on the game's rules and purpose. As each group assembles for their exercise, the rules are reviewed. Next, all but the team commander are sent to the sandtable area to put on their radios and helmets. The team commander is given an operation order by the task force commander (chief controller) and an inaccurate sketch map. Polaroid pictures of the sandtable simulating aerial photographs are available if the team commander asks for up-to-date intelligence. He then joins the rest of his group and is given a few minutes to brief them before the game begins. The mission in the order is not that which develops in the play of the game. This tests the ability of each of the players to react to the unexpected. To add confusion as well as demonstrate the importance of a continuous flow of information in combat reconnaissance, the team commander is at no time allowed to see the sandtable. He has to rely on the information provided by his subordinates.

Each group of participants play differently. Although it is the enemy who takes the initiative, once the friendly vehicles are initially deployed on the sandtable, both sides act and react. The situation used in the game emphasizes the coordination of fire and movement. The unit leader must be able to employ resources not organic to his force. This is achieved by denying the friendly team the most desirable avenue of approach to the objective. When the team commander is forced to use a less desirable avenue, he can do so suc-

cessfully only if he requests air and artillery support. Once the commander reaches and implements this decision, game play is terminated and the participants are then brought around the screen to view the sandtable while a critique is conducted. The total time involved for each group is 45 minutes.

Problems

Lessons learned in the current version of the game will be used to refine it further. One problem involves the fact that all platoons, as well as the company commander, were on one radio frequency. This had the administrative advantage of slowing the pace of the game as well as demonstrating the need for concise radio messages. However, a disadvantage of the communication system is one of making it difficult for the platoon sergeants to get on the air to coordinate their actions with their platoon leaders. Only if the platoon leader's vehicle is destroyed does the platoon sergeant have an opportunity to participate fully. The second major problem is the use of a sketch without grid lines. This results in a loss of realism when artillery and air support are requested.

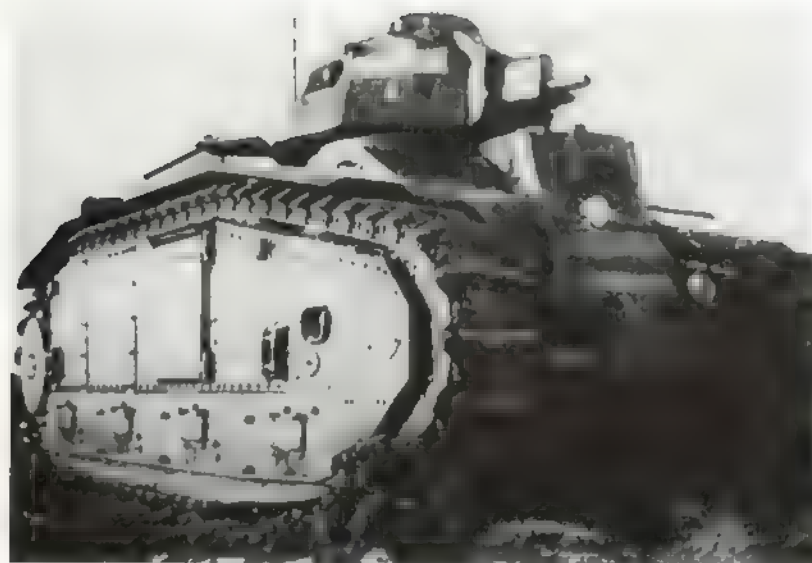
Conclusions

What is significant about the "Tankers' Game"? First, it is an economical training device that can be used at battalion or company level to assist in the preparation of company decision makers. The game can be played by officers and senior NCO's while the remainder of the unit is engaged in maintenance or other activities. Second, it is an excellent device to develop junior NCO's and specialists as they approach the time when they are to be given their first tank or a platoon sergeant's responsibilities. Third, the game's restricted vision, noise from blaring radios, unfamiliar terrain, and rapidly changing events combine to introduce sufficient tension to enable small unit leaders to maintain their tactical acumen while in garrison. Fourth, it can help reduce the complacency that develops when one operates on familiar ground during FTX's. In addition, the economy and almost limitless situations which can be conceived make the "Tanker's Game" a valuable learning situation.

Finally, the game is a method to approximate the real world; to allow each participant to answer for himself the question of what combat is like, and to develop a sense of urgency in the uninitiated before actual combat painfully demonstrates the need for that sense.



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A GOOD TANK MISUSED

by Raymond Surlémont

In 1940, the French Army was equipped with one of the most impressive tanks of the time. Its design and development was mainly due to the farsighted driving spirit of General J. E. Estienne, the father of French tanks, who had been appointed *Inspecteur des Chars de combat* soon after World War I.

Designing a tank has always been quite a time-consuming and expensive affair. In 1921, General Estienne headed a committee which drafted the specifications of a future tank for the French Army. These specifications stated the need for a 15-metric-ton battle tank, armed either with a hull-mounted 47-mm or 75-mm gun and two turret-mounted machineguns, and powered by a 120-h.p. motor. The Schneider, Renault, Forges et Chantiers de la Méditerranée (FCM), Forges et Acieries de la Marine et d'Homecourt (FAMH/Saint Chamond) and Delaunay-Belleville companies were invited to submit tenders and prototypes. Accordingly, between 1922 and 1924, each company built a pilot model. The five prototypes were presented at Rueil on 13 May 1924. The most interesting were the *SR-A* (Renault) and the *SR-B* (Schneider), the latter incorporating a double differential steering system combined with a Naeder hydrostatic unit. Engineering tests were undertaken and the Delaunay-Belleville model was soon eliminated from contention.

The results of the trials indicated that product improvements were needed and, in March 1925, a new program was substituted. It incorporated the best design features and trends of each of the former prototypes into an outgrowth designated either *Char B* or *Tracteur 30*, the latter for security purposes.

In March 1927, a contract was let to the Schneider-Renault group, the FCM and FAMH/Saint Chamond companies for the manufacture of three pilot models of the *Char B*. Actually, two were built by the Schneider-Renault group at Rueil and one by FCM at Marseilles. These three prototypes were delivered, extensively tested, and worked into

shape between 1929 and 1933 at Rueil, Bourges, Mourmelon and Coetquidam. In prototype form, the *Char B* weighed 25-metric tons, had a four-man crew and was armed with a 75-mm gun mounted in the hull beside the driver, two machineguns in the hull, and two turret-mounted machineguns. The 75-mm gun had an elevating gear, but it was traversed by pivoting the tank. The engine was a Renault 6-cylinder, 180-h.p. in-line type, and the steering system which was also used for laying the 75-mm gun on its target, was inherited from the former *SR-B* prototype tank. Armor protection was 25-mm thick. The *Char B* was thus designed to provide close support to the infantry advancing into a heavily shelled area in keeping with the French tactical concept of the time.

A contract for a small production run of seven vehicles was given to Renault in March 1934. Further changes were incorporated and the tank became known as the *Char B1*. It weighed 32-metric tons combat ready, and it incorporated substantial improvements, such as a more powerful 250-h.p. aircraft-type engine. Instead of the two machineguns, the turret housed a 47-mm *SA/34* antitank gun plus one machinegun, thus enabling the *Char B* to cope with enemy tanks. Mechanically speaking, the *Char B1* was far ahead of its time: it featured a regenerative steering-aiming system employing a double differential with a Naeder hydrostatic unit in the steering drive. Thus, the 75-mm gun, which had no independent traverse, could be laid on its target by the driver through the infinite number of turning radii provided by this sophisticated device. There was also a fixed machinegun in the hull, which was cable-operated by the driver. Supported by a combined coil and leaf spring suspension, the tank moved on a Holt-type suspension—modernized by FCM—which involved rear sprockets driving off-barred soleplate tracks. The suspension was entirely covered by skirting with an entrance door on each side. There was also an exit door on the rear of the turret and an emergency escape hatch in the floor, often used for the disposal of

empty projectile cases. Armor had been thickened up to a maximum of 40-mm. The tank also included a pressurized lubrication system from grouped grease nipples, self-sealing fuel tanks, an electric starter supplemented by a compressed air starting device, a bilge pump driven off the engine, a gyroscopic direction indicator, and fireproof bulkheads.

Other small orders for *B1* tanks had been placed in 1934 and, after the completion of a total of 32 machines, the *B1* series was discontinued in 1937. Meanwhile, a so-called *Programme 1930* had been established which called for an upgraded successor, namely the 35-metric ton *B2* battle tank. The *Section Technique des Chars* had also studied a 45-metric ton *B3* and even a 50-metric ton *BB*. But ideas and requirements grew more rapidly than actual development studies, and all these projects were pre-empted by a tougher version of the *B1*, which became known as the *B1-bis*. In



The Char B ran on tracks of unusual design.

1935, a further improvement of the basic design was also decided upon—the 36-metric ton *B1-ter* with armor thickened up to 75-mm.

The tougher *Char B1-bis* started leaving production lines in 1937 as a descendant of the *B1*. The major discernable change between the *B1-bis* and its predecessor was the replacement of the original turret by a thicker *APX-4* turret carrying a 47-mm *SA/35* gun. The maximum armor protection was also increased to 60-mm, and consequently the weight had grown to 32 metric tons. The demand for more driving power had been met by boosting the Renault motor to 300 h.p., which gave the tank a top speed of 28 k.p.h. (17.4 m.p.h.).

Char B1-bis Technical Data

Weight, combat loaded 32 metric tons

Crew 4

Dimensions

Length, overall 6.37 m

Width, overall 2.50 m

Height, overall 2.79 m

Ground clearance 0.48 m

Track width 0.21 m

Performance

Speed, maximum 28 k.m./h

Maximum gradient 40°

Fording depth 1.47 m

Trench crossing 2.75 m

Step 1.68 m

Range 5½ - 8 hours

Power to weight ratio 9.5 h.p./ton

Mechanical details

Engine one Renault, aero-type, in-line
6 cylinder, 16.5 liter water-cooled, developing 300 h.p. at 1,900 r.p.m.

Gearbox sliding gear 5 fwd.—1 rev

Steering regenerative double differential with Naeder hydrostatic unit

Armament

75-mm SA/35 gun in right front of the hull, no traverse, elevation, 25°, depression, 15°

7.5-mm. machinegun fixed, operated by cable

47-mm SA/35 gun in one-man turret

7.5-mm machinegun in one-man turret, coaxial but in separate mount

Armor

front and sides 60-mm

rear 55-mm

bottom 20-mm

turret 60-mm

Communication

ER 35 telegraphic set, plus flags

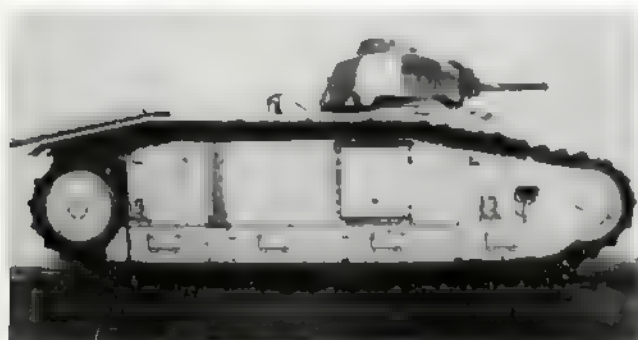
Led by the government-owned *Atelier de Construction de Rueil* (ARL), the production of the *Char B1-bis* was spread among the Renault, Schneider, FAMH/Saint Chamond, and FCM companies. The delivery rate of the new machine was rather slow; less than 40 machines per annum in 1937 and 1938. Plagued by strikes and retooling difficulties, the newly nationalized French tank industry could not progress quickly enough to meet the needs of the 4-year rearmament plan laid down by General Gamelin in 1936. However, manufacture was accelerated from 1939 onward, partly due to the new company *Atelier de Construction d'Issy-les-Moulineaux* (AMX). This state-run factory had been drawn into the production group after the nationalization law of 1936 and, by autumn of 1939, was delivering *B1-bis* tanks.

Although a remarkable tank from an engineering point of view, the *Char B1-bis*, which could trace its inception back to 1927, was already obsolescent in overall design. The tactical concept on which it had been designed was no longer valid. Mechanically complicated, the *Char B1-bis* was costly to produce and required highly trained specialists for its operation and maintenance. The commander, who also acted as a gunner and loader in the one-man turret, headed a poorly distributed crew including a driver, a loader, and a wireless operator. While the driver was also the aimer for the hull-

mounted 75-mm gun, the loader was kept busy in combat in fitting the independently stowed fuzes on 75-mm shells. Thus, the two main crew members, i.e. commander and driver, were overworked at the expense of efficiency. The powerful new engine consumed so much fuel that the effective operational time without refueling fell from 8 hours to 5 1/2 hours. The radio batteries only charged when the engine was running, so when fuel was short, radio silence was imposed. The tracks, well suited for moving over shelled and



Char B-1 bis



muddy terrain, were brittle when running on a hard road surface. Because of this weakness, these tanks had to be transported by rail on special flatbed cars for long distance displacements.

Since 1936, the ARL had slowly led a revamping of the original design, the *B1-ter*, based on an overland and reengineered *B* tank prototype which had been tried from 1937 up to 1939. The *B1-ter* was an endeavor to overcome the defects recognized in the *B1-bis*. The 75-mm gun was thus provided with a limited traverse and the crew had been increased to five men. However, the major difference between it and its predecessors was a sloping arrangement for some of the side armor plates. A new turret and more powerful engine (400-h.p. V-12, or 350-h.p. L-6) were also foreseen. Three pilot models were turned out at the ARL and at the Fives-Lille and FCM companies in 1940.

When war broke out in September 1939, about 170 *B1/B1-bis* tanks had been delivered to the French Army. Under pressure of events, the formal creation of armored divisions, or *divisions cuirassees de reserve* (DCR), which had been studied but postponed since the mid-30's, was at last directed. The *brigades cuirassees* were hastily organized at the mobilization and were to be expanded into DCR's early in

1940. Two *divisions cuirassees* were activated at Chalons and at Haute Moivre on 16 January 1940, while another one was formed at Mourmelon on 20 March. The *Char B1-bis* became the backbone of these DCR's in which they were incorporated at the rate of two battalions forming a heavy demi-brigade with 68 tanks. There was also a light demibrigade with two battalions of *H-35/39* tanks. As such, the nominal strength of the French DCR was only 158 tanks, about half of a German panzer division. In May 1940, a total of 387 *B1* and *B1-bis* were in service in the French Army.

The start of the mobile war in the West (May 1940) caught the French armored divisions in the stage of organization and training. Initially held in GHQ reserve, they went into battle not as whole units, but in piecemeal order, and suffered often from fuel shortage. Additional fuel tanks were designed for product improvement of tanks, but there was no time to implement this advancement. As they were, the *Char B's*, as well as their lighter stablemates, the *H-35/39's*, were just capable of a short-range advance at a measured tempo. In a few weeks, the French armored formations were wiped out by the more maneuverable German panzer divisions which were capable of long-range sweeps. A conglomeration of units brought together as the 4th DCR, under the command of Colonel (later General) Charles De Gaulle, provided a limited example of how a DCR should be used, but it was then definitely too late and France collapsed.

The end of the Western campaign left the Germans with an impressive war booty, including a number of *B* tanks. A few were converted by Rheinmetall Borsig as *10.5-cm leFH 18/3 (Sf) auf Geschutzwagen B2 (f)* in which the hull-mounted gun had been discarded. While some stripped samples were used as *Pz.Kpfw.B2 (F) Fahrschulwagen*, or driver training tanks, some others became *Pz.Kpfw.B2 (f) Flammenwerfer* by substituting a flamethrower for the 75-mm gun. A few *B* tanks returned to French hands in 1944 and played a role in the reduction of the last pockets of German resistance in the Atlantic Wall, notably at La Rochelle and at Royan.

A product of the French mechanical and military genius, the *B* tank can be considered as a major inspiration behind several foreign designs of 1939-41, both in shape and in armament arrangement, namely the British *TOG*, *A-20*, and (*A-22*) *Churchill* heavy tanks, and even, though to a lesser extent, the American *M-3* medium tank.



RAYMOND SURLÉMONT, from Belgium, has been interested in armored fighting vehicles for many years. Mr. Surlémont has authored a number of articles in the French magazine *Blindes*, *Armes*, *Moteurs* and in the English magazine *Artix*.



**IS THERE REALLY
AN UNCLE SAM?**

A reader of the *Washington Post* once wrote to the editor of the paper asking, "Is there really an Uncle Sam? You know who I mean: the tall, rugged, white-haired figure in red-and-white striped trousers, blue coat, and star-spangled hat. Is he still around or is he hiding out in the mountains of Vermont or some other place?"

The editor's reply read in part: "Of course there is an Uncle Sam! He is a simple fellow who has built a great country with his own hands. His ancestors crossed an ocean to find an alien shore here. More than 50 nationalities of free men have found a free life here. Freedom of choice, freedom to read and write and speak, and to give glory to it all."

The editor's reply captured the spirit of the legendary figure of Uncle Sam, but it did not tell the full story of the gentleman who has become the symbol of the United States.

Although he is nearly always shown as a cartoon character, the original Uncle Sam was actually a real person. During the War of 1812, Samuel Wilson, a meat packer from Troy, New York, supplied beef to the Army. This beef was marked with the letters "U.S." to indicate that it belonged to the government, but since Wilson was known to his packing house workers as "Uncle Sam," they referred to government beef as "Uncle Sam's" meat. Soon the troops picked up the expression and Uncle Sam became the nickname of the United States. Within 5 months, the first image of Uncle Sam was printed in a leaflet published in Albany, New York. By 1813, a visitor from France wrote home that "Americans are waking up to the fact that their Uncle Sam is a mighty fine gentleman." And, in 1825, federal employees were telling their friends they worked for Uncle Sam.

A resolution passed by the Congress of the United States in 1961 recognized Wilson as the namesake of the national symbol.

From the early 1830's to the outbreak of the Civil War in 1861, Uncle Sam and his "nephew," Brother Jonathan, were used interchangeably by American cartoonists to represent the United States. Cartoonists of the British humor magazine, *Punch*, did a great deal to set the stage for later development of the "modern" Uncle Sam. *Punch* cartoonists usually drew Uncle Sams and Brother Jonathans as lean, whiskered gentlemen wearing top hats and striped trousers. Perhaps the first to standardize the caricature of Uncle Sam was the American cartoonist, Thomas Nast, beginning in the early 1870's. By 1900, through the effort of Nast and other cartoonists, Uncle Sam was firmly entrenched in the minds of Americans as a symbol for the Republic.

The famous craggy-faced Uncle Sam seen on U.S. Army recruiting posters is the work of artist James W. Flagg, who used himself as a model. The painting first appeared on the cover of a magazine in 1916. A year later, the War Department adapted Flagg's painting for use on recruiting posters and printed 4,000,000 copies. It was revived just before World War II, and has been used intermittently since then.

Cartoonists usually call upon Uncle Sam in times of crises. And he is usually shown as a controversial figure in the press, often being used as the butt of a political joke.

A Harvard University historian says of Uncle Sam, "The figure of Uncle Sam is now no more a symbol . . . into which lover or hater can pour his feelings . . . Uncle Sam is the kind of symbol that even a very determined pressure group in our culture cannot alter. It would probably take a revolution or a dictator (of the United States) to change him. I, for one, much prefer the old gentleman as he is, with his many good points intact; he is unassuming, and clearly has a sense of humor."

Uncle Sam, with his early 19th century clothing, may not always be a happy man, but he is a determined one. And, although some cartoonists may depict him in an unfavorable light, to Americans he represents the best traits of the American way of life.

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August 1972*

Trainers, Rise Up!

There are many officers and men who entered the Army some years back prepared for the life of a soldier. Strict regimentation, attention to detail, physical fitness and absolute combat readiness were traits they expected to find in an Army which had succeeded so many times before.

They expected rigorous training, not guaranteed education; combat ready units, not flag details.

Title 10 of the U.S. Code specifies rather clearly what the Army must do. Its mission shall be the "... preparation of land forces for the effective prosecution of war... and organizing, training and equipping for prompt and sustained combat." From these simple words it becomes apparent that the sole mission of the peacetime Army is to train and train and train—to prepare our forces to fight—to prepare our forces for war.

To do so, the Army must chip away the barnacles of bureaucratic embellishment surrounding our training mission. We must reduce the proliferation of functions currently being performed by the peacetime Army and we must convert ineffective garrison time to effective training time.

The Army is making some progress in this area. The new Army Training and Evaluation Programs (ARTEP's), while not yet an effective tool for collective training of the combined-arms team, are surely a major step in that direction.

The day surely will come when the maneuver forces and field artillery will be tested together in a live-fire environment—as they will fight. So the spirit is there, the doctrine is there and the desire for success in future wars is there—but something just as important is missing—the atmosphere for effective training.

Our priorities are misplaced, misoriented, and mistaken. The taxpayer who shells out the \$25-billion for a fighting Army is paying for a tentacled monster of gigantic proportion that has thwarted the Army's ability to train. The arms and legs of this monster are a diversity of narrow-based Army programs, administrative drawbacks of bureaucratic regulations, and the sheer enormity of conflicting commitments and personnel turnover that beset the small unit commander.

A recent analysis of a division artillery unit in USAREUR demonstrates the point. Seventy-one percent of that unit's available time, 258 of 365 days, was unavailable for unit training. Of the 29 percent available time remaining, only 16 percent (roughly 18 days) was spent at the major training area. While the picture will change with each unit, the problem is essentially the same.

The next major area contributing to the hostile training environment is that of personnel turbulence. While the turnover at battalion level is most discouraging, the turnover of NCO's in key positions in the battery is incredible. Rotation of 10 chiefs of firing battery and six

executive officers in 13 months destroys a continuous and viable training program of any caliber! Key personnel shortages add more fuel to the fire. A unit with only 55 percent of its assigned enlisted strength cannot be expected to train efficiently.

Let's look at some other detractors:

On-duty Education: The obligation to educate the soldier is one which we, as an Army, have assumed. The mission to train is one with which we are tasked. Let's educate the soldier on his own time.

Administration: A recent study shows that company commanders are devoting approximately 60 percent of their 10-hour days to company administration. The solution to this problem is questionable, but we must attack the bureaucracy, reduce the reports and get back to the mission. Paper work be damned!

Unit Schools/Quotas: Units, because of pressure from well-meaning higher headquarters, are forced to fill mandatory quotas merely to fill quotas and sustain the system. This must be revised; quotas to fit unit needs—not quotas for their own sake or to prove that we're "training" our soldiers.

Details/Unforeseen Commitments: Nothing interrupts a well-planned day, week, month, or year like details and unforeseen commitments—all of which add up to personnel chaos for the commander, and personnel chaos means training chaos.

Inspections: We have inspections for every occasion. They detract from valuable training time and contribute little to real readiness. Do away with them? No. Control them, reduce them to the minimum and concentrate them on areas directly related to improving things that count.

Live Fire Safety Regulations: Range safety regulations are deterrents to effective live-fire, combined-arms training. These regulations are well intentioned. However, they must be changed. The Army must be willing to accept some element of risk to achieve the greater goal of realism in training.

People Programs: The real way to take care of our people is to have them completely prepared for battle. If we don't, they may die. Then, the race relations/human relations instruction, the on-duty education, the drug/alcohol abuse classes and the rest are really not very important.

What's needed to change this hostile training environment is a radical reorientation at the highest level. We don't seem to think training is important enough to the success of the Army to fire the guy that fails in his training. Until the right man, in the right place, dictates that training becomes number one, the hostile training environment will never change—it will only worsen. However the little guy, the battalion and battery commander, can cope with it, can live with it, and can beat the hostile training environment. But he must proceed carefully lest the monster encompass him. He must.

Have a burning desire to have a trained unit. And, he

must be willing to take his efficiency report lumps, if necessary, to do what he knows is right for the Army and the country.

Short circuit the bureaucracy. Regulations are designed for interpretation by persons in positions of authority. The commander must use this advantage to get things done.

Drive for combined-arms, live-fire training. He must talk about it—discuss it with the boss—make it

seem like the boss' idea; then the boss might decide it's a good idea.

Have attainable training standards and goals. Then he must translate the goal into a plan, and execute.

The time has come to start a training revolution. Trainers, rise up.

Condensed from an article by Captain Lee Baxter in the January-February 1976 Field Artillery Journal.

Russia's T-64 Tank

Some Russian armor units are now being equipped with the new T-64 battle tank, according to an article by J. Gratzl in the February 1976 issue of *International Defense Review*. (The T-64 has been temporarily designated the T-72 in Great Britain and is known in the United States as either the T-70 or T-72. — Ed.) The new tank, which marks a relatively large step forward in Russian fighting vehicle development, incorporates some revolutionary features—including a three-man crew, a 125-mm gun, and an automatic loader for the gun's separate ammunition. (The author of the IDR article notes that the 125-mm gun is contrary to information published previously by the magazine.)

By equipping the T-64 with a 28-round automatic loader similar to that on the BMP-1, the Soviets have succeeded in producing a tank that is fully capable of fighting on the move.

The installation of an automatic loader resulted in the elimination of one crewman (the loader), making it possible to position the tank commander and the gunner side by side high up under the turret roof. This arrangement of crew stations permits the propellant charges to be positioned under the turret platform in a radiating pattern while the projectiles stand vertically around the circumference of the turret platform.

The loading system feeds both the projectile and charge up to the gun in one pivoting movement. Then, when the round is in position in the breech, the charge is tipped over and rammed in behind the projectile.

Continuing his discussion of the loading system and ammunition stowage, the author of the IDR article surmises that if the driver has access to the turret, it can only be when the turret is in one particular position. And, since statistically the turret is most often in the 12

o'clock position, access to the turret is most probably arranged to coincide with this position.

Gratzl also notes that two equivalent sized magazines are located to the left and right of the loader hoist, which leads to the supposition that two types of ammunition can be used. This then, leads to the assumption that, in accordance with existing Soviet operational doctrine, these are probably fin-stabilized kinetic energy and high-explosive rounds. Since the perforating power of the fin-stabilized round is not much less than that of a shaped charge round (depending on the structure of the target) there is no need for the latter anyway.

Other observations and descriptions of the T-64:

The concentration of ammunition in a reduced space on the floor of the fighting compartment—only four ready rounds are stowed in the turret—has reduced the danger to the crew from their own ammunition.

Necessary rotation of the projectile is obtained by rifling a section of the barrel near the breech.

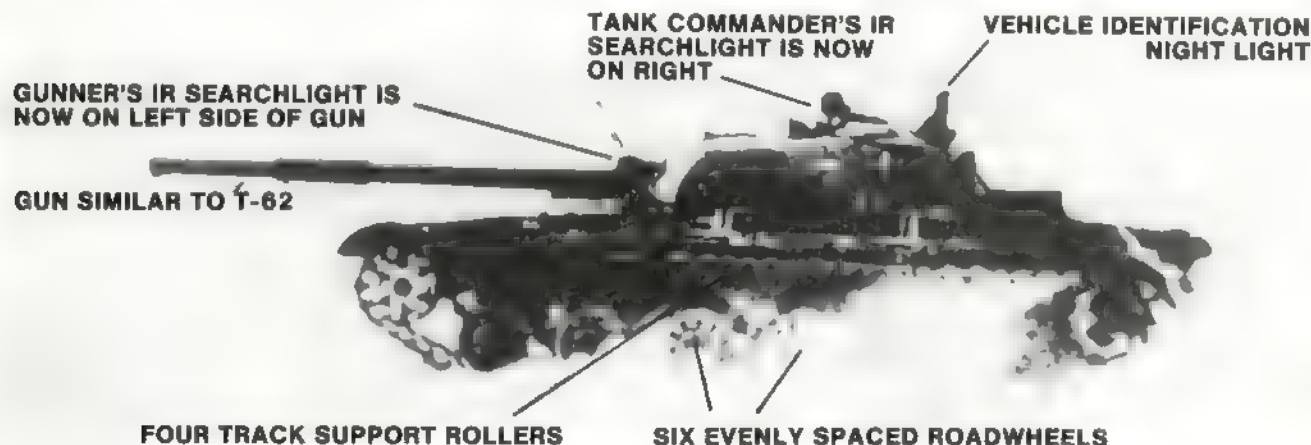
It is probably possible to use additional propellant charges in the T-64 just as it is in the T-62.

Increasing the caliber of the gun allows the perforation capability of the ammunition to remain adequate for the next 15 years by retaining the use of steel as the core material.

It appears that there has been no change in the fire control system, which remains essentially the same as that of the K version of the T-62, with a stabilized primary gunner's sight and provision for the commander to fire the gun using a coincident sighting technique.

The T-64 is fitted with passive night vision devices that are probably of better quality than those on the BMP-1.

Mobility of the T-64 is believed to be designed to be



equal to that of the *BMP-1*.

The designers of the *T-64* have probably attempted to obtain a power/weight ration equivalent to the 23 h.p./ton of the *BMP-1*.

If it is assumed that the total weight of the *T-64* is 40 tons, it would require at least 920 h.p., and it seems unlikely that the actual engine horsepower is much below this. Since a further significant increase in the power of the existing standard tank engine was out of the question, the suggestion that a new engine has been designed for the *T-64* could be correct.

Top road speed of the *T-64* is reported to be 49.7 m.p.h. (80 km.p.h.), making it probable that the single-radium planet gear regenerative steering system, used in the *T-62*, has been replaced with a newly developed steering unit.

Following successful preliminary trials on the *T-62*, the *T-64* is the first Soviet tank to be fitted with rubber-bushed track links.

Because the low profile of the new vehicle leaves no room for increasing the travel of the large road wheels of a Christie-type suspension, it is believed that it may have become imperative for the Soviets to adopt a suspension with support rollers.

An increase in combat weight of the Soviets' new tank has made it possible to add 1,100-2,200 lb. (500-1,000 kg.) of frontal armor to the hull.

The relatively low combat weight and the limited overall width seem to support the hypothesis that the *T-64* does not have spaced armor or special armor installed in the hull sides in the region of the turret. However, it should not be assumed that it will be an easy matter to knock out a *T-64* with a frontal attack, using unguided infantry antitank weapons equipped with shaped-charge warheads.

Steeling of Tankmen

The commanders and political workers of our tank regiment give a lot of attention to preparing servicemen for the hardships of battle by molding in them high moral, combat, and psychological qualities. They fully realize that political education and ideological steeling constitute the basis of such a preparation. Psychological training enhances the men's ability to perform combat missions and to act decisively in tense and dangerous situations. It makes them feel their personal responsibility for the defense of their country and helps them withstand any moral and physical stress, displaying courage and self-possession at a critical moment.

The regiment has good material base and training facilities that help the commanders to create the necessary tactical background for the lessons and to introduce, within the requirements of the safety regulations, some elements of risk. Specifically outfitted stations allow the tankmen to get training in overcoming various obstacles, including the negotiation of water barriers with the tank afloat or moving on the river bed. Difficult situations specially created during training make the men apply all their moral and physical forces and skillfully handle weapons and equipment. Of

course, it is rather difficult for recent draftees to withstand considerable emotional and physical strains at the beginning. That is why the commanders and political workers adhere to the well-tested pedagogical principle: from the simple to the complicated.

Take underwater tank driving, for instance. This hard and complicated process calls for each member of the crew to display courage and self-control. But before a crew proceeds to actual driving under water, it undergoes thorough training. The tankmen study the theory of the problem followed by shallow driving practice. The exercises are made more complicated every day. The men get used to long stays under water and gradually overcome their hydrophobia. At last, having gone through several successive stages of training, the tankmen begin practicing actual underwater driving. This method rules out any possibility of fear and hesitation in carrying out a mission. There was not a single case in the regiment of a young driver-mechanic's wavering before driving a tank under water for the first time.

Success in the psychological training of tankmen is directly dependent on the organizational work conducted by commanders and political workers and the purposefulness of this work in the performance of fire missions, during tactical exercises, in underwater driving, etc. Taking this fact into account, each exercise is planned in detail. Much attention is given in particular to the exercises which involve risk, danger, and other hardships. On the days preceding the exercises, the personnel are told about the conditions of an exercise and the succession in which it is to be carried out; they are reminded of the safety measures and are mobilized to fulfill their training and combat missions with courage and decision.

At practical lessons, the commanders try to diversify the conditions for psychological training. Yet, they reproduce only the situations most likely to be encountered in modern combat, such as explosions, "enemy" artillery attacks, and road-blocks. The officers see to it that the soldiers do not simplify the situation, but act as in real battle, with all their efforts applied. Training the fighting men in a complicated situation helps them to overcome fear and to display self-control and independent action.

Experience has shown that efficiency of training generally increases when the fighting men are morally ready to endure great nervous and physical strains, and know what is expected of them in a specific situation. So, prior to practicing tank driving, for example, the officers brief the crew commanders and driver-mechanics on the route and the obstacles most likely to be encountered. The soldiers begin to see these things in their mind's eye and get themselves ready for courageous and decisive actions in the anticipated situation. Fighting men thus prepared do not show any signs of confusion or hesitation, but, unlike unprepared men, muster their will and follow the line of conduct that is most acceptable and rational in a given situation. Such servicemen are generally masters of the situation.

The behavior of any soldier in combat depends largely on his professional level. Accordingly, developing psychological qualities in the tankmen of our unit is

placed on a par with their professional training.

The prime motive force, however, that imparts courage, valor and heroism to Soviet servicemen and leads them to perform various feats of arms is their communist ideology and political consciousness. A fighting man well trained morally, politically, and psychologically is capable of decisive action in any situation and of fulfilling his duty toward his country at any moment. Bringing up such men is the chief concern of Soviet commanders and political workers.

From an article by Major M. Rudachenko in the Soviet Military Review - January 1976

Artillery Support for a Division Covering Force

When it is necessary for all three brigades to occupy the forward defense area because of the width of the division sector, support of the covering force becomes more difficult and techniques must be less traditional. The 3d Infantry Division has concluded that, in this instance, the covering force is best provided individually by the three brigades. The three organic direct support battalions then would be available to support the covering force and their respective brigades upon withdrawal of the covering force. The three 8-inch batteries of the divisional general support battalion might well individually reinforce the three direct support battalions and regroup only after withdrawal of the covering force; an alternative is to supplement their fires with those of corps 8-inch battalions. Fire support coordination would be accomplished by the three direct support battalions within their individual sectors. Firing laterally across the interior brigade boundaries would be accomplished by coordination between brigade fire support officers. Division artillery headquarters would assist when appropriate with additional fire support assets not available to the direct support battalions.

Suppressive Fire Support

The suppression of the enemy's direct fire weapons is the artillery's principal mission in support of both the covering force and main defense. With the enemy's weapons suppressed, the division's own direct fire weapons may then take his armored vehicles under killing fire. Moreover, suppressive indirect fires, if applied with surprise, may themselves kill the crews of armored vehicles which are not yet buttoned up. Accordingly, responsiveness and surprise are enhanced by prescribing standard shell and fuze combinations.

Direct support battalions at all times should know the location and type of all fire units that are in position to fire on preplanned targets within the direct support battalion's sector. Priorities and updated target information should be provided to these fire units by the direct support battalion fire direction center (FDC). If the direct support battalion FDC receives a fire mission that merits all available fire, it can then call for fire from not only its own and reinforcing units, but also units in adjacent brigade sectors.

Dedicated Battery

Immediate suppressive fires will often be required in fluid situations when the enemy takes friendly maneuver elements under fire from areas where friendly suppressive fires have not been preplanned. The dedicated battery is a new technique which would increase responsiveness in such situations. The covering force commander would determine which subordinate force might require a dedicated battery.

This is an extension of the direct support mission, and the direct support battalion commander would still have the inherent responsibility of the direct support role—that is, support of the entire brigade. For the concept to work effectively, without detracting from the support of other elements of the brigade, at least one battery of the direct support battalion and all reinforcing battalions would remain free of dedicated status. The dedicated battery fire direction officer would anticipate operational requirements by closely monitoring the frequency of the supported maneuver unit. This technique is a quick-fire channel directly from maneuver units.

Batteries should be dedicated for brief periods of time (normally not more than 24 hours) or for a specific phase of the operation. The maneuver and field artillery commander must agree on the length of time the battery is to be dedicated. Whether in dedicated status or not, each battery should lay on a priority target when not engaged in a fire mission. Requests for immediate suppressive fire would be fired instantaneously—rounds in the air within 30 seconds.

Withdrawal

In those cases where the covering force is a great distance forward of the main force, so that supporting artillery must withdraw through the covered force, detailed and centralized planning and execution will be necessary. A special problem is that, although tanks can approach the covered force with gun tubes pointing to the rear, field artillery self-propelled weapons are designed to be pointed toward the main force as they approach it. This makes them easily mistaken for attacking enemy tanks. Uniformity of recognition symbols and coordination of passage points are therefore essential. It is especially critical that junior leaders personally coordinate the passage ahead of time and, when possible, rehearse this difficult operation.

To insure continued support of the covering force, all batteries of direct support battalions, whether in dedicated status or not, must maintain the capability to split into halves and move by bounds (leapfrog).

Conclusion

The tactics and techniques discussed here capitalize upon the field artillery fire support currently available to the covering force commander. If employed skillfully, they can kill tanks, strip armored formations of their accompanying infantry, deceive the enemy commander and maximize the supported commander's opportunities for success.

Condensed from an article by LTC Ronald B. Stevens in the November-December 1975 Field Artillery Journal.



In my January-February 1976 editorial "A Look Down the Pike" I mentioned a vehicle designated the T-92. We have had numerous requests from readers to feature this vehicle in *ARMOR*.

The T-92 was a light gun tank development program which commenced in 1953 and was terminated in 1959. It was a highly photographed and publicized configuration, no doubt because it was rather unique in appearance, looking low and racy for a tank.

The T-92 design incorporated the following unusual features:

- Cleft turret, providing silhouette (4/5 height of the M-41 tank
- Large (89-inch) turret ring
- Semiautomatic loading of 76-mm gun and automatic ejection of spent brass from the turret
- Dual machinegun cupolas (.50 and .30 cal) commander- and gunner-operated

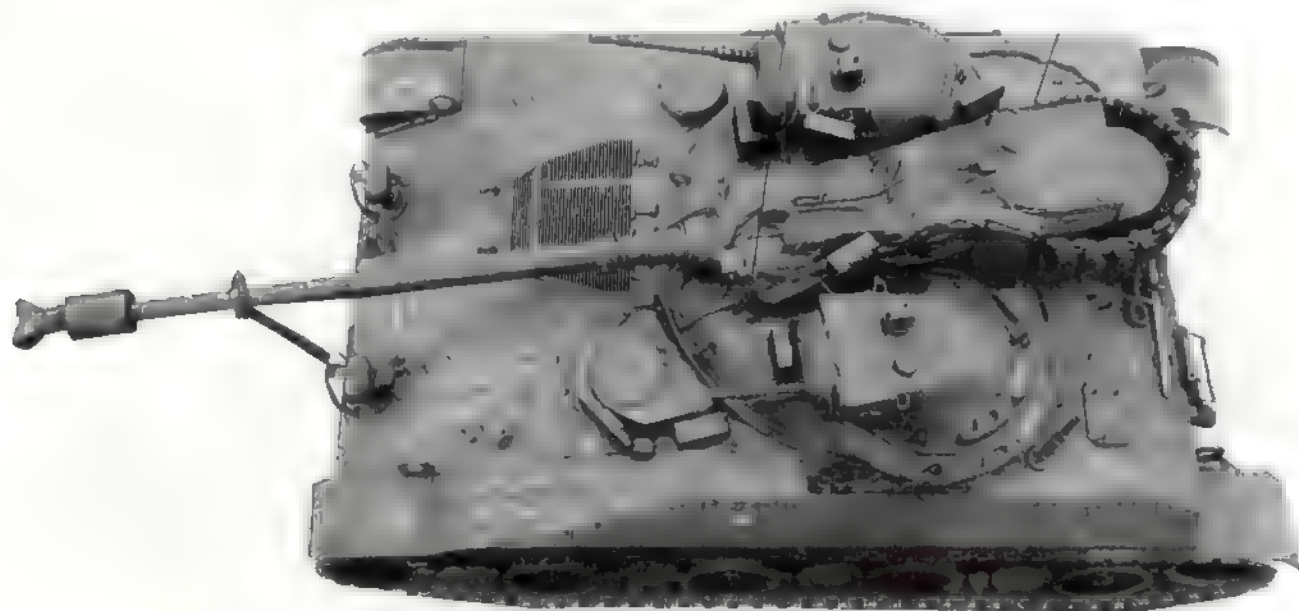
- Entrance at rear of tank, providing ease of loading and protected emergency crew evacuation

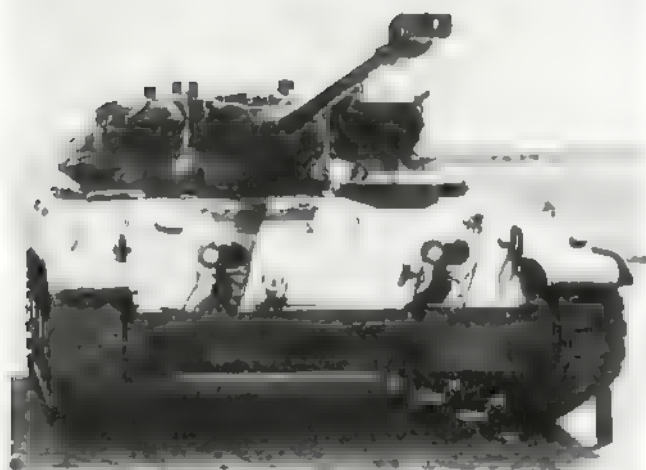
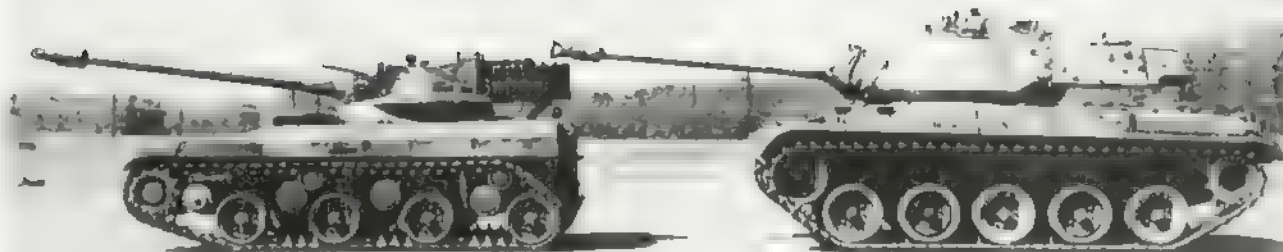
- "Torsilastic" suspension utilizing rubber brushings instead of conventional steel torsion bars

The T-92 was a development to replace the M-41 in the early 1960's. Despite high expectations, it did not measure up to the old "Bulldog" during tests. The T-92 was not as fast as the M-41 and could not fire its main gun as rapidly even with an automatic loader. The biggest problems, cramped and uncomfortable crew positions and lack of adequate ammo stowage for sustained combat, could not be overcome without redesign.

The T-92 was a low, good riding vehicle mounting a convention gun: it had a lot of potential. The following statement best sums up the final report. "Future vehicle procurement programs should give more attention to human-factors engineering requirements during early equipment development phases."

—Editor





T-92

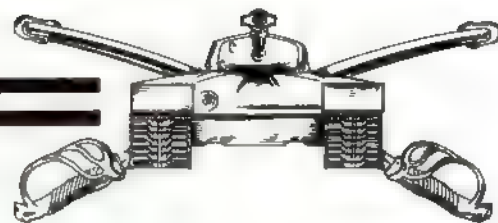
18.5 tons
 76-mm, T185E1
 246 3/4 in.
 124 in.
 85 in.
 A01-628 (340 G.H.P.)
 XT-300
 35 m.p.h.
 1/2 @ 65°

Weight 25.5 tons
 Gun 76-mm, T91E3
 Length, Gun Stowed 274 1/2 in.
 Width 129 in.
 Height 108 in.
 Engine A0S-895 (500 G.H.P.)
 Transmission CD-500
 Top Speed 45 m.p.h.
 Frontal Armor 1 in. @ 60°



M-41

OPMD - EPMD ARMOR



Armor Branch has always put forth an extensive effort to ensure that all Armor officers are kept abreast of the various developments and changes in the field of officer management and professional development. In times past this was achieved through the *From the Armor Branch Chief* in *ARMOR* Magazine, the Armor Branch News Letter; frequent trips to the field by members of Armor Branch; officer visits to Branch; personal correspondence with individual officers; and telephone conversations. Because of monetary constraints, the Branch News Letter has been discontinued and trips to the field by Armor Branch personnel have been drastically curtailed. This has caused us to lean heavily on *ARMOR* Magazine to get the word to our officers.

In view of the recent changes, reorganization of OPD (now called OPMD - Officer Personnel Management Directorate) and implementation of OPMS, it is absolutely necessary that all Armor officers receive accurate and timely information. We perceive that this isn't always happening, although the past issues of *ARMOR* Magazine have provided this kind of information. We encourage all who have not had the opportunity to read *ARMOR* to do so. Those who have already done so may benefit from a review of past articles.

In this issue our objective is to provide an update to those items published earlier and to emphasize those areas we feel are important to your best interest and the Army's as well.

Homebasing/Advanced Assignment Program

When an officer is alerted for a short tour assignment, he is also given his next assignment. The objective of the program is to reduce personnel turbulence and realize a savings on PCS dollars by minimizing the movement of families. In many cases, families presently residing in government quarters will be permitted to remain in quarters. The installation housing officer at your particular post should be contacted for details.

Options available are: leave your family/household goods at your present duty station and return to that same location (Homebasing) or move family/household goods to a projected station either prior or subsequent to the short tour and return to that same location on rotation (Advanced Assignment).

Officers who deviate from a projected Homebasing or Advanced Assignment option will be assigned to the post nearest their family/household goods consistent with Army and their specialty requirements.

Photographs

Many officers have responded to our past requests concerning photographs. However, some of the photographs which we are receiving are not very good. Such things as an epaulette over the collar, shirt cuffs showing below the

blouse sleeve, buttons unbuttoned, collars sticking out, uniform wrinkled or ill fitting are painfully evident in a photograph. Ensure that you look your very best before having the picture taken and request that you be allowed to see it before it is mailed to us. Those of you who have yet to find the right time to have your photograph taken, do it now. When files are reviewed for whatever the purpose and there is no photograph, the reviewer *may* conclude that the officer doesn't care very much; isn't very soldierly appearing and doesn't want others to know; is vastly overweight and has outgrown his uniform; or a multitude of other equally less than positive thoughts, even though they may not be justified. To preclude the wrong impression, get your photograph taken, check it carefully and send one copy to your Branch and one to your Official Military Personnel File (OMPF).

NOTE: The address for sending items for inclosure in your OMPF (only) is:

DAPC-PSR-R
200 Stovall Street
Alexandria, VA 22332

Career Patterns

In today's environment an Armor officer's first 5 to 8 years are normally spent in Armor troop assignments or in a combination of Armor troop and other related troop or branch immaterial assignments. Emphasis is placed on insuring that every officer is assigned in a manner to meet both the Army's requirements and to allow for his professional development as an Armor officer. During his company grade years (years 1 through about 10), every officer should have an opportunity to serve in a variety of Armor duty positions at company and battalion level as well as to attend the advanced course and to command at the company level.

Attendance at the Advanced Course will usually occur between 3½ and 8 years of commissioned service. The Advanced Course is now primarily aimed at preparing officers to command at the company level and serve in staff positions at battalion level. The course is six months in length.

Graphically speaking, the first 5 to 8 years might typically look like this: CONUS (36 + months) — AOAC (6 months) — OVERSEAS Long Tour (39 months) or, OVERSEAS Long Tour (39 months) — AOAC (6 months) — CONUS (36 + months) or, OVERSEAS Short Tour (13 months) — CONUS (36 + months) — AOAC (6 months) or, CONUS (36 + months) — OVERSEAS Short Tour (13 months) — AOAC (6 months).

Only after an officer has developed his basic branch skills, completed the Advanced Course, and commanded at the company level, all in a satisfactory manner, can he realistically expect to be allowed to pursue other assignments

or schooling in which he is particularly interested. If you want to talk about your particular career pattern and professional development needs, call your assignment officer or visit Branch if it's convenient.

Just remember that you will spend your first 5 to 8 years growing professionally in *Armor*. If your preferences for assignment and schooling match this goal, Armor Branch will be able to do well by you and by the Army.

Eligibility Criteria for Flight Training

Officers desiring to attend flight school should apply as shown in AR 611-110. Competition for the relatively limited flight school quotas is very keen. Selections are made from the "best qualified" applicants with demonstrated manner of performance being the primary consideration. Prerequisites include:

- Have less than 60 months Active Federal Commissioned Service upon enrollment.
- Be under 30 years of age at time of enrollment.
- Be able to meet standards of a Class IA flight physical (Graduates of USMA Flight Program and ROTC Flight Training Programs require a Class II Physical).
- Have a minimum score of 155 on the composite FAST-OB test. (For officers who completed the AROTC Flight Training Program in college, DA Form 2220—Evaluation of ROTC Trainee as a Potential Army Aviator—is acceptable in lieu of FAST-OB).
- Have served a minimum of one year duty with troops.
- If USAR, be in a Competitive Voluntary Indefinite (CVI) status.

Additional information concerning eligibility and applications may be obtained from Major Gass, the Aviation Management Officer, Company Grade Combat Arms Division, AUTOVON 221-7818/7819.

NOTE: ROTC instructors should advise cadets graduating from the AROTC Flight Training Program that attendance at flight school after AOBC is not automatic. AROTC graduates must compete for space with other officers who have completed the above requirements and may not go to school until after serving in a troop assignment for one or two years.

Communicate with Branch

Do not hesitate to call, write, or visit Branch. We are here to serve you, the Armor officer. We will do our best to answer your questions concerning future assignments, professional development and promotion potential.

Recognize, however, that we no longer provide input to promotion boards. In evaluating your file, we will provide our best estimate as to where you stand relative to your contemporaries and what kinds of assignments you should seek for further professional development. This will be a subjective evaluation only! We no longer develop or use OML's. If you are hesitant to call and would prefer that your battalion commander do it for you — don't! We cannot give your battalion commander or anyone else information concerning your file, unless we have your written permission. We are very friendly and would much prefer to discuss your concerns with you. Come see us!

OPMS

Alternate specialties for captains in basic year group 1969 will be designated in August 1976. Factors influencing the designation process include an officer's preference, specialty experience and aptitude, level of civil education and needs of the service. Officers who did not submit a specialty preference (DAPC-OPMD-Form 854) during May 1976 should contact their local Military Personnel Officer (MILPO). To obtain additional information pertaining to alternate specialty designations, write to DA (DAPC-OPEP), USA MILPERCEN, 200 Stovall Street, Alexandria, Virginia 22332, or call Major Herbert E. Koenigsbauer, Jr., Specialty Coordinator, Company Grade, Combat Arms Division, AUTOVON 221-7820/7819.

Data Changes To PQR And ORB

Widespread misunderstanding exists among officers concerning data changes to the Personnel Qualification Record (PQR) and Officer Record Brief (ORB). The belief is that correction/update to the PQR will automatically trigger a corresponding change to the ORB, and vice versa.

The two records appear to be directly linked because much of the information contained on the forms is identical and frequently changes simultaneously. But in fact, the two records are maintained within separate data bases. The information on the PQR is maintained by local personnel officers using SIDPERS or a manual system; the ORB data is maintained on the Officer Master File at MILPERCEN. When a routine change occurs on the PQR, a Report of Change (DA Form 2876) must be submitted by the personnel officer to effect a corresponding change to the ORB. Naturally, changes can be made to either record when they are reconciled during an annual audit.

Remember that errors discovered on your PQR or ORB must be brought to the attention of your personnel officer to effect corrections. The personnel officer has the knowledge and means to correct both records.

RA Selection Board (RASB)

The selection rate resulting from the last RASB was 34 percent; for Armor Branch 43 percent (the highest selection rate of all branches). We believe the likelihood of this high selection rate continuing at least for the next several boards is good. If you have been thinking about applying, do it! This is the right time.

The next RA Selection Board is scheduled to convene in late September 1976 and will consider those applications that were received at DA by 30 June 1976. Late March 1977 is the tentative date for the following RASB. AR 601-100 and DA CIR 601-63 govern the appointment of officers in the Regular Army. As those of you who have applied know, selection and appointment is a time-consuming process. To help you better understand why this is so, the following explanation of the selection/appointment cycle is provided.

The Regular Army Selection Board normally meets twice annually. Each board is announced and an application cut-off date established by a DA circular in the 601 series. The

cut-off date is normally 60 to 90 days before the board is scheduled to convene. It is important to note the applications are not received by Armor Branch; they go through the Personnel Actions Section of the PA/PD Branch, Combat Arms Division (DAPC-OPE-P), to Assessments Branch (DAPC-OPP-P). A 60- to 90-day period is required to prepare applications for presentation to the selection board.

The selection board is in session for approximately two weeks and requires an additional 10 days to two weeks to prepare their results for submission to the MILPERCEN Commander for approval.

After this tentative selection list is approved, individual letters to the applicants notifying them of their selection or nonselection, must be prepared, signed and dispatched.

The names of those officers tentatively selected for appointment must be submitted to the President for nomination and to the Senate for confirmation, a process which requires an additional 60 to 90 days or longer. In the meantime, the applicant must be certified as physically qualified by the appropriate examining facility commander. This means a physical if the applicant has not had one in the preceding six months.

After Senate confirmation and the physical determination has been made, each selected officer is sent an appointment packet, through channels, which contains the necessary forms for execution of the oath of office. Finally, when it's executed, you're a Regular Army officer.

So that we can assist you in getting your shot at selection, we recommend that you make sure your application includes all supporting documents required by AR 601-100 and the DA Circular that announced the selection board. Include only the originals of all documents constituting your application (a change to AR 601-100 is forthcoming).

Also, ensure that the application is properly addressed. The application is to be forwarded, through channels,

THRU: HQ Department of the Army
ATTN: DAPC-OPE-P
200 Stovall Street
Alexandria, VA 22332

TO: HQ Department of the Army
ATTN: DAPC-OPP-P
200 Stovall Street
Alexandria, VA 22332

Request the personnel officer at the level from which the application will be forwarded to DA (general court-martial authority) to send it by certified mail. While Assessments Branch does acknowledge receipt in writing, certified mailing will provide you further assurance that your application arrived before the cut-off date.

Advise Assessments Branch of any changes in your address; a post card will do.

Files: Yours, Theirs & Ours

Unless you've visited MILPERCEN sometime in the memorable past, you may not know how your files are organized and maintained. Briefly, there are two files on hand in MILPERCEN: The Official Military Personnel File (OMPF) and the Career Management Individual File (CMIF).

The OMPF (alias "TAG" file) is, like its name says, your

"official" file and is maintained by Officer Personnel Records Branch, MILPERCEN. It is organized into an efficiency and an administrative section and contains, basically, the original of your OER's, a photograph, promotion and award orders, letters of commendation, and transcripts. Since your OMPF is used by selection boards, you should insure its accuracy by visiting MILPERCEN periodically throughout your career. In order to review your OMPF, you must make an appointment NLT two working days in advance (AUTOVON 221-9618/9619 or Commercial 202-325-9618/9619). To have documents placed in your OMPF, mail them to:

HQ MILPERCEN
ATTN: DAPC-PSR-R
200 Stovall Street
Alexandria, VA 22332

The CMIF (alias "Branch" file) is limited only to that information and those documents essential to accomplishing personnel management/assignment functions. Like the OMPF, it contains both an efficiency and an administrative section. In it, we maintain a copy of your OER's (we get a copy 3-4 months after the original OER is submitted), a photograph, preference statement, transcripts, orders reflecting changes in status and assignment, and correspondence between you and us. We don't maintain letters of commendation or awards in your CMIF since they are not essential to our management functions. To have documents placed in your CMIF, mail them to:

HQ MILPERCEN
ATTN: DAPC-OPE-R
200 Stovall Street
Alexandria, VA 22332

FY 77 Civilian Schooling

The following is an update of the civilian schooling programs for FY 77. Selection for graduate study is designed to meet specific Army requirements and must be in a predetermined academic discipline; a discipline in consonance with the officer's designated alternate specialty. Prerequisites for selection are: an outstanding performance record, completion of the Advanced Course, and full qualification in your primary specialty. Undergraduate degree schooling is available to officers who have attended the Advanced Course, possess a record that supports promotion and retainability, can complete their degree within 18 months, and are available for reassignment. Priority is given to those who can complete in 12 months or less. Civil School applications are accepted anytime and will remain active in your management file until you are selected or otherwise become ineligible. Contact Major Bryan or Miss Wright at AUTOVON 221-7818/7819 for further details in Combat Arms Division.

Fully-Funded Advanced Civil School

Combat Arms Division has 80 openings in the following disciplines for fully-funded advanced civil schooling during FY 77. Officers who are selected study for a period of up to 18 months and are required to serve a 3-year utilization tour

immediately following graduation. If interested, apply under the provisions of AR 621-1, Chapter 4, dated 6 May 1974.

Journalism	Social Psychology
Operations Research/ Systems Analysis (Engineering & Business)	Area Studies Management Research Aeronautical Engineering
Comptrollership	Guided Missile Engineering
Automatic Data Processing (Engineering & Business)	Nuclear Effects Engineering Engineering Physics
Electronics Engineering	Education Audio-Visual Aids
Nuclear Physics	

Advanced Degree Program For ROTC Instructor Duty (ADPRID)

Combat Arms Division has a total of 115 openings for officers to enter graduate school for the purpose of obtaining a masters degree and remaining at the same institution to serve a 3-year tour as an ROTC instructor. In cases where a university does not have a masters program, the graduate degree will be pursued elsewhere. Officers must study in one of the following shortage disciplines.

If interested, apply under the provisions of AR 621-101, dated 1 May 1974.

Area Studies	ORSA Business
Engineer Electronics	Engineering ADPS
ORSA Engineering	Engineering Aeronautical
Comptrollership	Engineering Communications
Logistics Management	Psychology, Social
ADPS Business	Physics Nuclear
Procurement & Contract Management	Education Audio-Visual Aids
Journalism	Engineering Nuclear Effects
Engineering Chemical	Guided Missiles
Geodetic Science	Criminology Corrections
Geography	Psychology, Applied
Transportation & Traffic Management	Banking & Finance
Hotel & Restaurant Management	Correctional Administration
Engineering Radio	Psychology, Experimental
Engineering Petroleum	Topography - Photo
Production, Motion Picture	Food Technology
Physics - Optics	Statistics
Safety	Engineering Physics
Physics Elec. Magnetic	Cultural Foundations
Astroynamics	Textile Engineering
Engineer Metallurgical	Math Crypto
Jet Propulsion	Metallurgy
Applied Mechanics	MBA (ADPS, Comptroller- ship Logistics Management (ORSA)

Preference Statements

This subject is an old one. We've written much about it before, but it bears repeating. We conscientiously attempt to match your assignment preferences with Army requirements. The term "Dream Sheet" only applies when you

- Ignore your professional development needs as an Armor officer and ask for some rather exotic assignment or schooling.
- Ask for an assignment or school you are not yet

qualified for (ie; ROTC instructor duty and graduate school).

- Wait until a month or two before your overseas DEROS or completion of your stabilized CONUS tour to send your preference statement to us.

- Prepare an incomplete statement with only one or two preferences on it.

Follow these simple guidelines and your success rate with the Preference Statement will noticeably improve.

Be realistic! Company grade Armor officers spend their first 5-8 years in troop assignments and in two basic schools — AOBC and AOAC. You know where the Armor posts are, so confine your choices to them.

Armor Branch will request school quotas for the schooling you need to perform in your next duty assignment. Don't ask for Special Forces training, Pathfinder, language school, and others unless you are going to a job which requires those skills.

Be timely! We work on assignments 4-6 months in advance of DEROS and reporting dates. Submit a new preference statement any time your preference changes, but *always* after each PCS move and *at least* 7-8 months before your DEROS or completion of your stabilized CONUS tour.

State at least three assignment preferences on your preference statement and be sure you'll be satisfied with any one of them.

If you follow these guidelines, the chances of our being able to match the Army's requirements for Armor officers and your preferences will be greatly enhanced and the term "Dream Sheet" might just become an anachronism!

EPMD - ARMOR

Enlisted Armor Branch notes will be appearing regularly to provide readers with selected information on enlisted career management.

Branch Reorganization

On 1 February 1976, the Infantry-Armor Branch completed reorganization. The Branch now consists of four sections; Professional Development (PD), Assignment, Drill Sergeant and Special Forces/Ranger. The PD Team is responsible for career planning as well as conducting an annual review of each NCO's record in the grade of E-6 or above. During this review, future type assignments such as TOE Unit, Drill Sergeant, NCOES, ROTC, Readiness Region Advisor, Instructor and Staff positions will be evaluated to provide for true career management and planning. The assignment teams, which consist entirely of civilian personnel, are organized based on military pay grade. Assignments are based on the type assignment programed by the PD Team. The Drill Sergeant Team selects and manages personnel in this highly competitive program. Upon rotation from this 24-month program, the PD Section, in coordination with the Assignment Section, provides a new career enhancing assignment. The Special Forces/Ranger Section accomplishes both professional career development and assignment of members in these specialized fields. A Branch

listing and telephone (Autovon) directory is provided for your convenience

Branch Chief LTC Ronald W. Zeltman 221-8055

Professional Development Section

Branch NCOIC & PD Chief SGM Raymond Knippel 221-8071

Armor PD Team

Section Chief MSG James Taylor 221-8072

PMOS 11D Manager SFC Duane Egbert 221-8072

PMOS 11E Manager SFC Charles Luster 221-8072

Assignment Section

Section Chief Mrs. Margaret Hawkins 221-8058

E-8 Team Chief Mrs. Sue Matonek 221-9399

E-7 Team Chief Mrs. Marion Trano 221-8059

E-6 Team Chief Mr. Jeff Welty 221-8057

E-5 & Below Team Chief Mr. Doug Wiggins 221-8056

Drill Sergeant Section

Section Chief MSG Tony Carrino 221-8070

Special Forces/Ranger Section

Section Chief SFC Ronald Matysek 221-8340

Visits to Branch are strongly encouraged. The Enlisted Personnel Management Directorate is located in the Hoffman I Building, 2461 Eisenhower Avenue, Alexandria, VA 22331. (Exit 2, on Route 495 or the Washington Beltway). Park in the visitors area only and register your car in the lobby of Hoffman I. There is a penalty for improper parking. Visitors must report to Room 212, Hoffman I.

Drill Sergeant Program

The Drill Sergeant Program is now a part of the career management pattern for NCO's in the grades of E-6 and E-7. Only personnel consistently placing in the top half of their contemporaries, based primarily on EER and MOS Evaluation scores, are selected for this program. Personnel may also volunteer for Drill Sergeant duty, but selection criteria are the same. Selection criteria are outlined in paragraph 11-65a of AR 614-200. Outstanding male NCO personnel in the grade of SGT may also be selected, but the individual's Battalion/Squadron Commander will be contacted in writing for recommendations concerning an individual's assignment to the Drill Sergeant Program prior to final acceptance.

Homebase/Advanced Assignments

Soldiers in grades E-5 through E-9 being assigned to unaccompanied dependent-restricted 12/13-month short tours overseas will be notified before their departure from CONUS of the next CONUS assignment they will return to under new DA policy announced in DAPE-MPE DR message 121714Z Feb. 76. The new policy — called homebase/advanced assignments — will return soldiers to their current CONUS location whenever possible.

Because 18-24 months lead time is involved in determining return assignments, some changes may have to be made. The Army expects many families to remain at the "homebase" where the soldier sponsor is currently stationed rather than move elsewhere until the soldier returns. Department of the Army policy allows families to remain in presently occupied government quarters under certain conditions.

The homebase/advanced assignment policy is designed to reduce permanent change of station family travel costs and give the soldier more time for personal planning.

The policy will initially apply to Korea-bound enlisted soldiers — E-6 through E-9 — who receive assignment instructions after 12 Feb 76 and depart CONUS after 1 Jul 76. It will be extended to all 12/13-month short tour areas worldwide for the top four enlisted grades who depart CONUS after 1 Oct 76. On 1 Jan 77 the policy will be further extended to soldiers through grade E-5 departing CONUS for any 12/13 month short tour area.

Personnel in grades E-5-E-9 currently in a short tour area or in CONUS are eligible for a short tour assignment should submit a preference statement (DA 2635) and indicate in block 15 the CONUS location of their dependents.

Enlisted Personnel Management System

EMPS was officially welcomed into the Enlisted Personnel Directorate on 1 October 1975. Career Management Field (CMF) 11 (MOS 11B, 11C, 11D, and 11E) is in the first group of CMF's converting to EPMS. Other CMF's will be phased into EPMS throughout FY 76. There are four primary objectives of EMPS.

1. Logical career patterns from E-1 to E-9.
2. Training throughout the soldier's career.
3. Equitable promotion opportunities.
4. Broaden soldier skills

Grade and skill levels have been altered in EPMS as depicted below.

GRADE	SKILL LEVEL
E-1 - E-4	1
E-5	2
E-6	3
E-7	4
E-8 - E-9	5

(Note: All CMF 11 personnel in grade E-9 have PMOS of 11Z5.)

Additional details concerning EPMS are announced periodically through *TIPS Magazine*, the *Army Personnel Letter*, and *MILPERCEN Focus* and the *Army Times*.

Foreign Service Tour Extensions

DA recently liberalized the FST extension policy. Requests submitted to Branch are carefully reviewed to insure that the applicant is serving preferably in his PMOS, that his MOS scores and EER ratings are not decreasing, and that commanders in the field desire to retain the applicant. □

NEW CHAPTERS

MG John K. Boles, Jr., USA-Retired, President of the United States Armor Association, proudly announced in May a first for the 91-year-old Association; two new chapters. First on board was the **Creighton W. Abrams Chapter** of Washington, D.C., with LTG Donald H. Cowles, USA-Retired as President, followed by the **Lone Star Chapter** of the Texas National Guard's 49th Armored Division. BG Delmer H. Nichols is its first president.

MG Boles presented the Lone Star Chapter's charter to BG Nichols at the 49th Armored Division Texas Barbecue on 19 May.

FORT HOOD TRAINING DAY

In a series of live-fire exercises for Fort Hood Training Day on 20 May, the armored corps' long-range, high-velocity weapons systems were used in exercises designed to demonstrate the deciding role the combined-arms team would play on the modern battlefield. More importantly, the exercises displayed the training needed to prepare the team to survive and beat enemy forces far superior in numbers and firepower.

Highlighted in the exercises was the need to use terrain for cover and concealment.

The more than 500 officers who watched the demonstrations were given a first-hand look at more than a dozen different cost-effective training devices used to train the soldier on his sophisticated weapon systems before ever going to the field.

Another area of attention focused on the responsibilities of the commander to oversee the battlefield, allocate the resources available and disseminate intelligence.

THE A-10

A single place twin turboprop aircraft specifically designed for the close air support mission, the **A-10**, is now in production for the U.S. Air Force.

The **A-10** design represents an optimization of short takeoff and landing (STOL) performance, maneuverability, radius of action, loiter, large flexible payloads and airspeed while maintaining low cost. Highly survivable and capable of operating from austere forward bases, the **A-10** will be equipped with an internally mounted, rapid fire 30-mm GAU-8/A cannon, AGM-65A *Maverick* missiles and the *Rockeye* cluster munition to insure maximum effectiveness against armored targets.

Designed to operate in the intense anti-aircraft artillery (AAA) environment that is anticipated to be employed by enemy AAA weapons, infrared heat seeking and radar guided ground-to-air missiles, the **A-10** has been "hardened" and proven through tests to be capable of defeating Soviet 23-mm weapons.

The Department of Defense authorized the Air Force to proceed with production release of 52 aircraft for FY 75 and FY 76.



The **A-10** is the first Air Force aircraft to be developed strictly to deliver aerial firepower in support of friendly forces.

ISRAEL'S NEW 155-MM SP GUN

A new self-propelled mount for Israel's 155-mm gun is now in prototype stages. Featuring a turret with all-round traverse that is suitable for fitting to the hull of almost any tank of 40 tons or over, the prototype represents a large improvement over the previous mounted 155-mm gun which was based on the *Sherman* and had a limited frontal traverse.

Designated **M-72** and designed to provide a modern SP system at a fraction of the cost of a purpose-built unit, the prototype uses an adapted *Centurion* hull, although the turret is said to be equally suitable for the **M-47**, **M-48**, and **M-60**.

The gun is the newly-developed **L-39** which has a range of 23.5 kilometers, compared with the *Sherman* **L-33's** 20.5 kilometers. For simplified logistics, internal ballistics of the **L-39** are identical to the U.S. self-propelled **M-109A1**.

Performance of the new gun compares well with the 155-mm of the **M-109A1**. Depending on crew proficiency, an initial rate of fire is 4-5 rounds per minute, 2 r.p.m. sustained. Muzzle velocity of the **L-39** is 820 meters per second, and elevation and depression range from -3° to $+65^{\circ}$. The crew of five consists of a commander, gunner, driver, and two loaders.

The gun fires all NATO standard 155-mm ammunition and carries 34 rounds and their charges in the turret. Total shell capacity is approximately 60. The turret ap-

pears unusually roomy, despite stowage. There are two large side doors and three roof openings, as well as a cupola armed with a .50 cal machinegun for air defense. Ammunition is loaded through a door next to the driver or through two small side ports in the hull. The *M-72* can be sealed in an NBC attack.

In addition to the normal telescope for indirect fire, a direct-fire sight enables the gun to be used as a defensive antitank weapon, scoring hits well beyond the range of most tank guns.

The gun is positioned to the rear over the engine housing for both traveling and normal firing.

GREIF, THE NEW AUSTRIAN ARMORED RECOVERY VEHICLE

A new Austrian armored recovery vehicle, *Greif*, was recently introduced. Equipped with the suspension of the light tank family, the vehicle will be utilized for repairing as well as towing Austrian armored vehicles.

For its protection, the *Greif* will be equipped with a system of smoke grenade launchers, as well as a 12.7-mm machinegun and several light Swedish antitank weapons. To provide a telecommunications capability, the vehicle will be outfitted with an integrated indoor and outdoor interphone system.

The retrieving equipment of the *Greif* consists of a main winch with jig and cable winching equipment, a crane boom which can lift and turn, and a dozer blade. Capable of pivoting over a range of 234° sideways and 0-68° vertically, the crane boom can also be extended from 2.45 meters to 3.75 meters and has a lifting capacity of 6.5 tons. These capabilities suffice to dismantle the engine or lift the turrets of the armored vehicles of the Austrian light tank family.

Located near the bottom of the vehicle, the main winch can be closed watertight, giving the vehicle a wading capacity. The cable of the main winch is 100 meters long and has a pulling capacity of 20 tons in a single pull.

SUPERVISOR MOS ADDED TO MAINTENANCE SECTION

An organizational tank turret supervisor, MOS 45K30 (E-6), in the maintenance section at battalion/squadron level has been approved by the Department of the Army, and the next published TOE changes will reflect the addition. The OTT Supervisor will be responsible to the Motor Officer and Motor Sergeant for all functions related to turret maintenance, including shop operations, prescribed load list (PLL) development, and repair parts. He is also responsible for providing technical supervision and training of subordinate turret maintenance personnel throughout the battalion/squadron. The feeder MOS's for this skill level are MOS 45N, P, R, K, B, and L. A resident course at the Ordnance Center and School will train personnel in the basic NCO course for this career management subfield.

PATTON MUSEUM

The *MBT-70* joined the Patton Museum of Cavalry and Armor historic fleet in January 1976.

Major General Chester M. McKeen Jr., Commander, TACOM, presented two *MBT-70*'s to the Armor Center Collection. The museum hopes to have one vehicle operational for demonstration purposes and the second tank ready for exhibit in the museum park. The *MBT-70* is a valuable addition to the operational collection and will take its place beside the *Panther*, *Centurion*, *Sherman*, *M-103*, *M-24*, *M-5* half-track, and several other representatives from days past, when the museum presented the Living History of Armor, on 4 July 1976 as a contribution to the Nation's bicentennial celebration. A Living History scene of 1975 is shown below.



38(t) Tank Destroyer and German infantry with an antitank gun.

NEW SEARCHLIGHT UNDER DEVELOPMENT

A new high-intensity searchlight, the *AN/VSS-4*, is currently under development for the *M-60*-series tank at the Army Night Vision Laboratory, Fort Belvoir, Virginia.

The *AN/VSS-4* development is aimed toward two armored configurations based on the use of common components. Designed for integration under armor in the *M-60A1E3* tank, the first configuration is an armor blister with a window and a manually operated rotating armor shutter that protects the searchlight when not in use.

The second configuration will have the optical unit inserted into an armor cylindrical shell, designed for mounting on the exterior of the *M-60A2* and *M-48A5* tanks or other such combat vehicles.

The beams spread of the *AN/VSS-4* can be changed automatically from 2 to 6 degrees in azimuth. The *AN/VSS-4* has visible and near-infrared modes of operation and it has the advantage of automatic slaving of its beam to track with the line-of-sight of the gunner's periscope.

The searchlights are scheduled for completion in FY 1978 and delivery in 1979. □

THE ART OF PSYCHOLOGICAL WARFARE: 1914-1945

by Charles Roetter, Stein and Day Publishers. 199 pages. 1974 \$8.95.

The author's suggestion that propaganda is a normal part of relations between the states (and within states themselves) is significant, for if so, states must maintain intelligence gathering and information capabilities to influence both internal and external audiences. Roetter's view is not new, but it is interesting when considered in light of the current spate of criticism against U. S. involvement in the affairs of other nations, and the use of government information and intelligence programs within this country.

The author has selected the period 1914-1945 as the point of entry for his study. He is quick to point out that no major campaigns were won by propaganda alone during the two World Wars, although psychological warfare was an important instrument of power. Roetter analyzes psychological warfare in terms of its aims and purposes, target audience selection, credibility, and communications effectiveness.

The British are given high marks for their propaganda efforts in World War I. The mobilization of hatred against the enemy, preservation of allied friendship and support, and demoralization of the enemy were major objectives of the British. Germany never put it all together during World War I. Throughout the war, the German propaganda effort suffered from the lack of coordination between military and civilian propaganda agencies, lack of appropriate themes, and poor target selection. U. S. propaganda centered around humanitarian Wilsonian ideals, while Czarist Russia had an extremely weak propaganda apparatus.

German propaganda in World War II was more carefully integrated with military plans. The uselessness of resistance and invincibility of the war machine were major themes. The Germans' themes supported them well in Western campaigns and attacks on immediate eastern neighbors, but the German analyses of the Soviet audience were faulty. What the Germans promised the "oppressed" peasants and what they provided were two different things. Ger-

man propaganda became more and more defensive as the war wore on. The Soviets directed their propaganda efforts toward national unity, seeking total dedication to the survival of the homeland. U. S. propaganda themes emphasized our dedication to the Four Freedoms of the Atlantic Charter — Freedom of Speech, Freedom of Worship, Freedom from Want, and Freedom from Fear.

U. S. Propaganda efforts were complicated by widely separated theaters of war and bureaucratic friction between the Office of Strategic Services and Office of War Information. Service responsibilities and discretionary powers of theater commanders further compounded coordination difficulties. British propaganda gained in acceptability as the war passed to the German homeland. Throughout the war, the British stressed resistance to the Germans, with their hopes symbolized in the "V for Victory."

Roetter's study is well illustrated and has an excellent name and subject index. The author has maintained his focus on the evaluation of the psychological warfare in terms of objectives, targets, credibility, and communications effectiveness. While the appeal of the book may be somewhat limited, it has a message for military and foreign affairs planners. Psychological warfare is a natural phenomenon and the awesome power of modern weapons demands that words be the first means used to influence the attitudes and actions of protagonists.

Lt. Col. William M. Stokes, III
First Infantry Division

THE SOVIET UNION AND THE OCTOBER 1973 MIDDLE EAST WAR: The Implications for Detente

by Foy D. Kohler, Leon Goure and Mose L. Harvey. University of Miami (Florida). 131 pages. \$4.95 (soft) and \$8.95 (hard).

As both the supporters and the critics of the Soviet-American detente are prone to point out, the latest Middle East War was a test of fire, or as one Soviet commentator termed it, a "serious proving ground" of detente. How well did the detente measure up in the Middle East test case? The answer, though less than reassuring, is authoritatively elucidated

in *The Soviet Union and the October 1973 Middle East War*. This book establishes that detente functioned either very well, or rather poorly, depending upon which criteria are used to make the judgment — Soviet or American. This work establishes that detente, as understood and carefully defined by the Kremlin, bears little resemblance to the concept commonly understood in the U.S., and in fact, the Soviet conception seems ominously similar to the meaning associated with the Cold War.

The Soviet version of detente is treated in depth by the authors, both as it shapes Soviet foreign policy generally, and as it explains Soviet support of the Arabs in the October War specifically. The Soviets, in fact, prefer to use the term "peaceful coexistence" to describe their relationship with the U.S. While detente is a rather innocuous word which literally means only a "lessening of tension or hostility, especially between nations," peaceful coexistence is a closely defined relationship, which has a special meaning to the Soviets. In the Russian view, the world we live in is a bipolar world consisting of two competing systems — capitalism and communism. Peaceful coexistence is a means of regulating conflict between the two systems. Peaceful coexistence does not mean "the end of the struggle of the two world systems," for the struggle is said to be "inevitable." It is a Soviet strategy for the eventual victory of communism over capitalism, which *only* excludes war between the U.S. and the U.S.S.R. as a means of resolving disputes; however, peaceful coexistence does not exclude "just" wars of "national liberation" and the "sacred duty" of the Soviet Union to provide support thereto. In other words, the Soviets assert that they will continue to support efforts such as those of the Arabs against Israel.

Although the subtleties and nuances of Soviet statements are often difficult to discern, the theme of this book is quite clear. The Soviets consistently adhered to their own principles of peaceful coexistence in shaping their Middle Eastern policies; they were little hindered by detente's responsibilities as widely understood in the U.S. According to the authors, Soviet actions followed several parallel paths all aimed at achieving Soviet objectives, which were often in conflict with the goal of reducing the possibility of the superpower confrontation the Soviets had accepted at the

1972 Moscow Summit. For example, the Soviets provided the weapons with which the October War was fought, and they encouraged the Arabs to use the weapons. The Soviets provided political and diplomatic support for maximum Arab demands, which had the effect of hardening the Arab position on a political settlement, thereby making war more likely. In fact, the authors posit, the only type of settlement that Moscow was interested in was one which would help strengthen Soviet influence in the Middle East. (All U.S. attempts to seek political settlement of the Arab-Israeli dispute prior to 6 October 1973 were ridiculed by the Soviets as a plot against the Arabs.) Most damaging to the West in the immediate sense was the constant encouragement given by the Soviets to the Arab oil producing countries to unite in purpose, raise oil prices, move deposits out of Western banks, nationalize Western oil companies, and to use their oil and fiscal resources as weapons to gain political objectives (which of course the Arabs did by imposing the oil embargo).

Rather than the Soviets being dragged into the war, they are clearly shown in this book to have actively encouraged and supported the Arabs' intentions. The most damning indictment of all was the Soviet threat to commit troops to the Middle East, which was of course the cause of the temporarily controversial U.S. troop alert, an action which was hardly conducive to eliminating superpower confrontations. Yet, with all of this, was the Middle East an aberration in U.S.-Soviet relations? The authors reply no, since in the Soviet view the struggle against imperialism is by no means restricted to the Middle East. As one Soviet commentator is quoted as saying

"... all talk about an end to the 'era of wars' and the arrival of an 'era of universal peace' is premature and dangerous." Even more sobering is a statement made by Brezhnev, the *primus inter pares* in the Politburo, addressing the World Peace Congress on October 26, 1973, in Moscow.

Of course, we are realists and we cannot fail to see facts of a different sort. We all well know that wars and acute international crises are far from being a matter of the past."

The reader will, of course, recall that the speaker was the Soviet architect of detente.

The Soviet Union and the Middle East War is no potboiler; it is based upon solid scholarship and analysis. Like many such books dealing with Soviet foreign policy, this one is laced heavily with quoted material from Soviet open sources and is therefore tedious to read at times. The reader who makes the effort will find the book worthwhile and quite enlightening.

Kohler, Goure, and Harvey conclude "that the Soviets violated both the letter and the spirit of the agreements signed at the Moscow and Washington Summit meetings." That is to say, the Soviets violated the rules of detente as they were understood in the U.S., and as they were written upon the protocols to which Moscow affixed her imprimatur. The authors see little basis for expecting the Soviet Union to practice restraint in the future resultant of any rules of detente. In the final analysis, it will be Moscow's assessment of the U.S.-Soviet balance of power, and of what the U.S. will tolerate that will engender restraint on Moscow's part.

Captain A. R. Norton
University of Illinois

THE GUN IN AMERICA by Lee Kennett and James L. Anderson. Greenwood Press, Westport, CT. 339 pages. 1975.

Today's newspapers are replete with arguments from progun and antigun lobbies as the gun control controversy increases in tempo with violent crime. As the arguments increase, their emotional content does also, until it is difficult to find any objective appraisal. Kennett and Anderson have done just that in this very fine study, however, and anyone interested in the gun control problem would be well advised to read this book.

The authors do not attempt to moralize at all. Instead, they describe in carefully researched, but readable detail, just how the gun has woven itself into our culture. They rightly observe that "the gun is part of a whole series of traditional attitudes about government, society, and the individual. They run, like so many threads, through the whole tapestry of the national past." Our beginnings as a nation differed widely from our European ancestors, and the gun was an essential defense in our hostile environment. As historical facts were enlarged into myths, the gun was embodied as an integral part of our way of life. Our permissive attitude toward weapons helped us to ignore the growing abuses by the criminal, the ignorant, and the ill-trained; and our unwillingness to alter anything in the Bill of Rights perpetuated that attitude.

The final chapter in the book, its summation and conclusion, is a superb essay in itself and is recommended to all readers. The book is thoroughly footnoted and is well worth the cost to every concerned citizen, sportsman, shooter, and history scholar.

John R. Byers
Colonel, Retired

DEFENSE: PROMISES AND PITFALLS by Gerald L. Steibel. Crane, Russak and Company, Inc. 89 pages. 1975.

Recent public statements by Alexander Solzhenitsyn and editorial analyses of President Ford's trip to Helsinki have brought detente under the microscope of public scrutiny. Dr. Gerald L. Steibel, who is Director of Foreign Affairs Research at the Research Institute of America, brings us a most timely study of detente, updating his 1969 monogram, "Detente. Dilemma or Disaster?"

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In this monograph, Dr. Steibel reviews the history of detente with special reference to its impact on arms control, crisis management, economic relations, the putative 'mellowing' of the Soviet regime, and relations with our European allies.

Following a reprint from the *Wall Street Journal* of Irving Kristols' essay on "The Politics of Appeasement," which clearly sets out the dangers the country now faces, Dr. Steibel succinctly, yet with an absolute clarity, provides us with the opportunities and hazards of detente with the Soviet Union.

The key to the understanding of detente is the interpretation given to the word by participants. We Westerners picked the French word *detente* and understand it as a relaxation. The Communists use a word which means "peaceful coexistence."

The difference in translation is enough for us to question, if perhaps in light of Solzhenitsyn's warnings, whether we should not consider the second French meaning of the word 'trigger' more appropriate. Dr. Steibel's final chapter provides a doer's guide to negotiation which, if the right people apply his cautions, will insure that detente does not, in fact, trigger further confrontations.

Colonel Corwin A. Mitchell
USATCA

THE GLIDER WAR by James E. Mrazek. St. Martin's. 304 pages. 1975. \$12.95.

Glider War is an engrossing study of a form of combat which had a relatively short life span, but had an enormous impact on the development of airborne doctrine and tactics.

While all allied and enemy nations of World War II are covered in their glider development and employment techniques, *Glider War* primarily concentrates on the participation of the United States, Great Britain, and Germany in this revolutionary form of warfare.

From the first use of German forces in a glider attack on Belgian's Fort, Eben Emael, the allied powers were rudely awakened to a new era of air assault and the devastating consequences. Frantic development and production of gliders began in the United States and Great Britain, often with tragic mismanagement and faulty design errors, which cost the lives of men and destruction of equipment. You will read of the incredible apparatus in which the United States was enmeshed, with a consortium of hundreds of independent companies

engaged in making parts of gliders and still more companies contracted to assemble of the gliders themselves.

Glider War also deals with the philosophy of the glider's employment. Germany used their gliders as an assault force to be reinforced by airborne drops of men and materiel. The United States took almost the complete opposite course in their employment. Great Britain meanwhile, employed gliders on somewhat of a composite view of both the German and American approach.

The writer, Colonel Mrazek, gives an in-depth study in the development of glider warfare, not only from an historical point of reference, but also from a factual point of view, since he participated in several air assaults in gliders. By the time the reader finishes the book, he will have a deep appreciation for the men who went into combat on glider wings. The exploits of these courageous men are a necessary part in the telling of this story, and all men who have recently gone into combat in our modern helicopter operations can feel a kinship with them—while sighing and thanking evolution for taking them beyond those trail craft.

Glider War also informs the reader on how far-flung operations were conducted, from the European continent, into Russia, India, and Indo-China. To be sure, some missions were highly effective—while others were tragic beyond belief.

The military reader will even glean some reasons why current philosophy of airborne operations are what they are—based on proven methods of operations started nearly three decades ago by those gallant men on silent wings. *Glider War* is informative, entertaining, and worth the time required to read this small part of our military history.

Charles E. Griffiths
Major, Retired

THE WAY OF THE FOX: American Strategy in the War for America, 1775-1783 by Dave Richard Palmer. Greenwood Press. Westport, CT. 229 pages. 1975. \$12.50.

If we are wise, let us prepare for the worst, there is nothing which will so soon produce a speedy and honorable peace as a state of preparation for war...

George Washington, 1782

The Way of the Fox is an excellent book which sets the record straight concerning many incorrect but common beliefs about the so called "Revolution-

Information concerning the availability of professional books may be obtained from the U.S. Armor Association, P.O. Box O, Fort Knox, KY 40121.

ary War." The book states that the war was not a revolution nor was it for independence. The American colonies were already self-ruling and independent. The "War for America" started when Parliament tried to retrieve power. To impose the King's will, the British tried five different strategies of which controlling the Hudson River was the most important.

On the other hand, the colonies had no executive authority, so Congress allowed George Washington almost a free hand in dealing with the British. The established American goals of territorial aggrandizement and independence remained constant throughout the war. However, while the goals remained constant, the four phases of the conflict were like separate wars. From April 1775 to June 1776, the Americans seized control of the 13 colonies. From then until December 1777, the Americans fought a defensive war. Beginning in January 1778, George Washington was looking for one vigorous victory which he found at Yorktown in October 1781. After that, there was a final struggle to keep America strong during negotiations. To quote the book, "George Washington employed American arms in perfect accord with American capabilities and needs."

The book is well organized and logically presented. The evidence presented confirms George Washington as a strategist, reveals how he became "first in war," shows how he began the road to being "first in peace," and provides excellent reasons why he should be "first in the hearts of his countrymen." The timing of the publication is perfect for the bicentennial celebration. Lieutenant Colonel Palmer has written and Greenwood has published another excellent "Contribution in Military History."

Colonel Carl M. Putnam
Chief, Atlanta Readiness Group

The staff of *ARMOR* Magazine regrets to report the death of one of its loyal supporters and authors, Colonel Carl M. Putnam, the former Chief of the Atlanta Readiness Group. Colonel Putnam was a contributor to and a member of the *Armor* Association for many years and will be sorely missed.

Ed



ARMOR

september-october 1976



Organize a Mechanized Force

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M-60 Turret

Dear Sir,

Captain Brown's analysis, "A Less Vulnerable M-60 Turret," May-June 1976, suggests that only those modifications the loader can make with his adjustable wrench would be acceptable due to cost considerations. The author could have made a stronger case if he had addressed the "benefit" side of his "cost-benefit" approach with other than an assurance that his proposals would result in a more survivable M-60. A more thorough analysis, predicting lower combat loss rates in terms of units and dollars, would significantly improve chances for the implementation of such suggestions, and might even buy us a few "exotic technologies." No one will argue with the long run need for improvement.

DOUGLAS W MILLER

Captain, Armor

Minneapolis, MN 55408

How to Win at 20:1

Dear Sir,

I have discussed "THE COMMANDER'S HATCH: THE FIRST BATTLE OF THE NEXT WAR" by Lieutenant General Donn A. Starry with some of the best fighters of the Israeli Army Reserve.

The unanimous opinion was, that if the article expresses the private opinion of LTG Starry, it merely shows that he is personally a very fine fighter. If, however, the aforementioned article outlines official U.S. Army doctrine, this is a major revolution in U.S. Army approach to combat.

We are certain that the U.S. Army has the necessary makings to be first in technology, training, and leadership, because professional soldiers—in contradistinction to draftees—can be carefully chosen to fit the required standards.

Please permit me to add to the above the Yuli Commitment, which we believe to enable us to fight and win at any odds. The Yuli Commitment is based on the Bible, The First Book of Samuel 14 6-15, and has been translated into modern parlance as to:

"fight without considering relation of forces, without preparing possibilities of retreat, and without caring for personal survival."

NOTE: Yuli is an acronym, expressing in three Hebrew words the spirit of the unit. Since it is very difficult to translate their meaning into English, I prefer to leave it untranslated.

Yuli of Israel was founded in 1974 and within several weeks had about 300 volunteers, mostly junior officers and noncommissioned officers of airborne and reconnaissance units, but was dissolved by our government before being able to get into action. Meanwhile, without the doing of the original founders of the Yuli organization, the Yuli Commitment spread by word of mouth and is presently adopted by about 5,000 men of the Israeli Army and Army Reserves.

Much thought and combat experience was concentrated in setting up Yuli and some of it may be of interest to the new U.S. Army. However, in order not to get beyond the scope of a short letter, I shall limit myself to the Combat Profile (CP) and the Combat Aptitude (CA).

The Combat Profile (CP) was presented as a questionnaire for self examination, on the assumption that potential volunteers would not consciously supply incorrect answers. In many cases, however, the volunteer found himself in a position to reply positively to two or more questions, and in this case it was the task of the interviewer to help him find his dominant CP. The questionnaire might be translated into English as follows:

When your unit joins battle your Combat Profile (CP) is being put to a practical test

%	CP	Combat Performance
55	1	You find all kinds of pretexts to leave your outfit before joining battle.
	2	You break down under fire.
	3	You run away under fire.
	4	You take cover, do not operate your weapon system, and do not take an active part in the battle.
35	5	You do participate in combat, but almost against your will, being dragged along by your comrades.
	6	You participate in combat actively, showing initiative and presence of mind.
4	7	You "read" the battle, understand from moment to moment what has to be done, and direct the men around you, sometimes irrespectively of your rank.
3	8	You merge into battle, become part of it and fight in a state of self forgetfulness.
2	9	You merge, as it were, into a white haze and do in-

stinctively and with incredible speed the right things.

- 1 10 You were either born this way or you passed through a process of inversion under extreme stresses which, however, did not break you down. In combat you are calm, swift and deadly. Life and death, fatigue and pain, heat and cold do not seem to affect you to a large extent. You operate best alone or within the framework of a very small combat team composed of men similar to yourself. You are capable of performing missions bordering on the impossible but you become easily bored with regular frontline fighting.

Elite forces, capable of fighting and winning at odds of 20 to 1 should be composed of CPs 7, 8, 9 and 10.

It is apparent from the above, that CP 7 has to be divided into commanding large CP 6 forces on the one hand and in leading elite forces composed of CPs 8, 9 and 10 on the other. Therefore, CP 7 is always in short supply.

The Combat Aptitude (CA) is determined by the answers to the questionnaire and the impressions of the interviewer. Female interviewers with professional backgrounds as qualified nurses or degrees in psychology make the most exact CA determinations. Combat team commanders, even very experienced ones, are apt to make mistakes, and this is also true for other male interviewers, regardless of their professional background.

The Combat Aptitude is not a moral judgement and should not be regarded as such, neither by society nor by the men themselves.

CA 1, 2, 3, 4 and 5 are suitable for service duties in the rear.

CA 6 make up the bulk of officers and men in frontline divisions in drafted armies. In small armies composed of volunteers, their services may be dispensed with, since they would not be satisfied with duties in the rear, but could not equal the combat performance of CPs 7 to 10.

CA 7 are combat leaders capable of reaching the highest echelons of command. Personally they are very fine and resilient fighters, able to give examples of combat performance to CA 6, but not to CA 8, 9 and 10.

CA 8 are extraordinary fighters but their

command responsibilities should be limited to personally supervisable units

CA 9 are unique fighters but should not command larger outfits than medium-sized combat teams

CA 10 escape easy description. They are superfighters, operating most effectively alone, but being alone they seem to merge into something larger than themselves and the feeling of loneliness is foreign to them. It is easier to employ them than to understand them and the most hair-raising missions are performed in the best possible way

The U.S. Army has now a one-time opportunity to choose its personnel along above or similar lines, thereby creating a small but nearly invincible force, capable of contributing significantly to the security of the free world

LIEUTENANT ETAN

Israel

"Night Fighting Capabilities"

Dear Sir

In the March-April 1976 issue of *ARMOR*, Major Privette ("Night Fighting Capabilities") presents a very succinct case for second generation passive night vision equipment from the user's viewpoint. As a representative of the developer and manufacturer of the AN/VVS-2 Night Driver's Viewer listed in the article, I believe we in industry tend to dwell on the technical aspects of a device, with little knowledge of the impact on tactical doctrine. It was most enlightening to read that the Threat is keeping up with the U.S. in passive night vision device deployment. This certainly bodes ill for the users of infrared headlights and searchlights.

In light of the development of passive night vision devices by both sides, as well as sophisticated antitank weapons, the need for a review of offensive and defensive nighttime tactics seems imperative. With the complexity and cost of today's armored vehicles, passive night vision may be considered relatively low cost insurance and a 12 hour per day service life extension

WILLIAM H. DYER

Bedford, MA 01730

"Tank, Supertank, No Tank At All"

Dear Sir

Major L. D. Holder's article in the January-February *ARMOR* was of some interest to me in that it reflected my attitude toward tank design which was summarized in a 1972 article, "Advanced Main Battle Tank." As you may recall, this article was a somewhat simplified version of a paper composed during the "fluid" weeks be-

tween the demise of *XM-803* and the convening of the Main Battle Tank Task Force. The article found some support at the time, reflecting as it did the rising attitude towards mobility and agility as determiners of survivability and the desire to come up with a tank cheap enough to build in large numbers. Major Holder quite eloquently reviews this position in his argument, and I was pleased on a personal level to see that the professional debate is still alive in some form. However, I feel at the same time that he is wrong in advocating the chimerical "cheap/fast" tank; and that my advocacy of that concept in 1972 was also in error.

One of the presumptions I made in that early thesis was that armor-array technology had been significantly overmatched by anti-armor ammunition capabilities and that it was consequently a waste of money and time to try to make tanks invulnerable, that tanks of the *M-60* category were too heavily armored to be mere small arms shelter and not heavily enough protected to repulse anything serious above the 30-mm category. To an extent, I still believe this, but I was talking about what the *XM-1* should be, not what the *M-60* was. Well, the *XM-1* seems to have obviated that argument (or so I allow myself to be convinced).

Next, I concluded that there were two approaches to the mobility/agility problem. The first was a lighter tank with an available engine/transmission — but by definition more modestly armored — and emphasis on avoiding or surviving rather than repulsing hits. This philosophy also made some qualifications concerning the gun size and type. The gun can be a tyrannical master of a lot of other characteristics, since the tank is, among its other missions, supposed to be a suitable arms platform. When the gun is a 120-mm or 152-mm, you are not talking about a 30-ton tank if you expect to have a good platform. To some extent the suspension and configuration of the gun mounting can offset this; but as any *M-551* gunner can tell you, the results are not always entertaining for the crew. The second answer was a large tank with a big engine and robust transmission, high horsepower and considerable torque. I reasoned at the time that such a vehicle would be too massive to drive across class 60 bridges or the San Andreas Fault. I was wrong (possibly the inevitable result of a psychologist meddling with mechanics), or so it appears when my earlier assumptions are compared to the performance of the *XM-1* prototypes.

So, I cling to agility (largely due to the results of my work with the *M-60A1* AOS/SIMFIRE exercises in 1973), but rejoice that it can be combined with good armor protection.

But the most telling argument is that of the threat. Since we will be denied numbers

(and this is fixed by the present number of people in the Army), there seems no escape from the need for fielding a significantly better tank than our potential enemies, with doctrine, organization and training to match

TIMOTHY R. O'NEILL

Captain, Armor

West Point, NY 10996

Combat Armor Badge

Dear Sir

The recent highly publicized decision on the acceptance and wear of Vietnamese combat badges, other than the EOD, airborne, and ranger badges, resurfaces a couple of very fundamental questions.

The first is, why does the U.S. Army not award a Combat Armor Badge? Anyone who believes that only the Infantry deserves such recognition because they are the only branch that "closes with and destroys the enemy" obviously has never been in or seen combat with an armored or armored cavalry unit. The "rules" for award of the Combat Infantry Badge in Vietnam were such that you had situations such as occurred to me in the 11th Armored Cavalry Regiment where enlisted men with infantry MOS's were awarded the CIB for action while on a dismounted ambush patrol while the tankers and armor officer who were on the same patrol received no type of award, being ineligible for award of the CIB.

The next question is, if DA wishes to avoid a proliferation of branch associated badges, why can the U.S. Army not award a Close Combat Badge regardless of branch? As alluded to above, the determining factor should be whether or not you actually had someone shooting at you, not what MOS or branch you were. Bullets do not discriminate.

Finally, if the U.S. Army will not award any combat badges other than the CIB, why not authorize acceptance and wear of legitimately won Vietnamese Combat Badges? There are a great many U.S. officers and men who were awarded the Vietnamese Armor Badge, either serving as advisors to Vietnamese Armor or Cavalry units, or serving in U.S. Armor units that worked very closely with Vietnamese units. I am very proud of the fact that I was awarded the Vietnamese Armor Badge, particularly since I was ineligible to receive a U.S. Combat Badge, and that it reflects that I saw combat in an Armor unit. I see no reason why I should not be allowed to wear it on my uniform.

WILLIAM A. KNOWLTON, JR.

Captain, Armor

Fort Carson, CO 80913





THE COMMANDER'S HATCH

MG JOHN W. McENERY
Commandant
U.S. Army Armor School

IS ARMOR BEST ORGANIZED TO WIN THE FIRST BATTLE OF THE NEXT WAR?

Armor has had the same basic battalion organization since the early stages of World War II. Our five-tank platoon, 54-tank battalion has suited us well in a variety of circumstances; but it's a large, somewhat cumbersome organization. There are indications that we might not be best organized to fight today.

A look at world tank organizations show that the U.S.S.R., France, Britain and Israel all use three- or four-tank platoons. The Federal Republic of Germany uses five, but is experimenting with three and four. This alone should tell us that we need to do some soul searching to see if we are optimally organized today. The *XM-1* and *MICV* will provide our formations with perhaps as much as a 100 percent increase in mobility which means that the tempo of operations will be that much quicker and the decision time for commanders will be that much less. The long range guided missile has entered the field of battle and plays a significant role with its overwatch and defensive capabilities while making the job of the commander more complex. These and other reasons have led us to conclude that we need to take a fresh look at how Armor is organized.

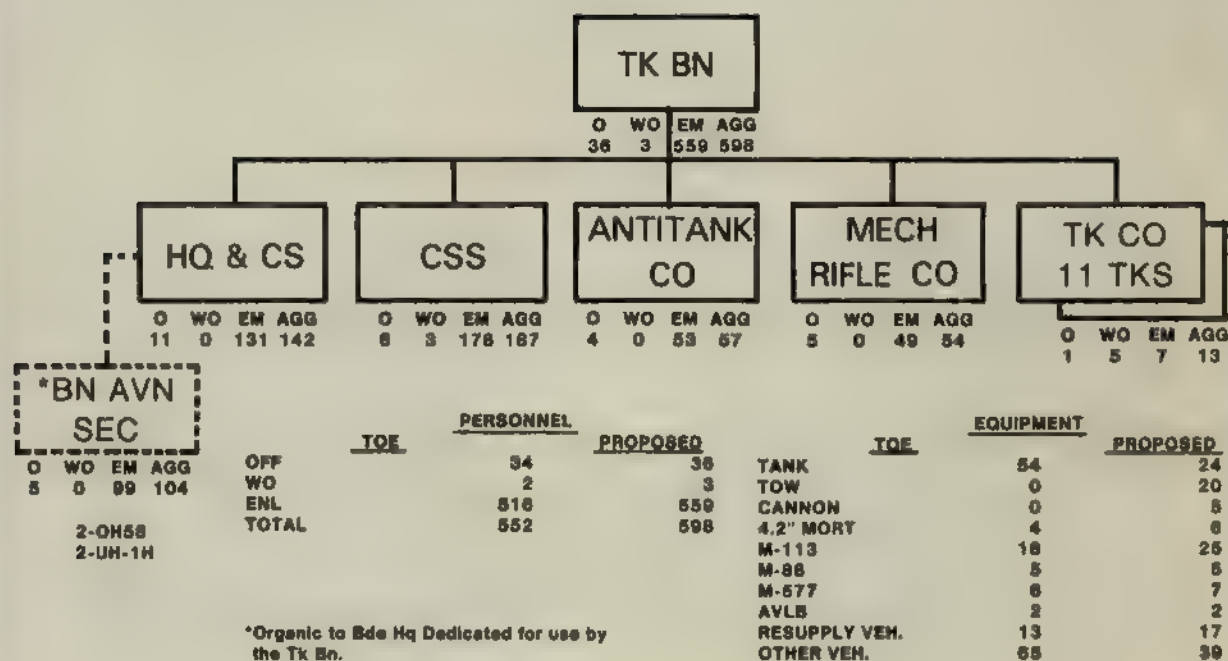
Many of us have said that the five-tank platoon is as simple an organization as exists in our Army. This is certainly true. Can one platoon leader get the maximum out of five or could two platoon leaders with six be more effective than the extra tank would indicate?

There are a number of interesting possibilities which we are beginning to examine. First, there is the three-tank platoon wherein fire and maneuver do not occur within the platoon. The three tanks of the platoon function as one with two tanks following and doing what the platoon leader does. Fire and maneuver then becomes a function of the company

commander who moves his platoons to insure that there is constant overwatch. As currently organized, our tank company is somewhat cumbersome, but with increased centralization, we can virtually eliminate the company headquarters. We can greatly decrease the company commander's responsibilities by centralizing administrative, maintenance and supply functions at battalion. We've already done this in the Army with our company clerks and administration through the CABL concept. This can also be done with supply and maintenance. We must insure, however, that the company still receives the same level of support that it has in the past.

Accordingly, what we might have in a company are three each, three-tank platoons and little more than a company commander, XO and first sergeant as a company headquarters. The purists will automatically declare that you will not be able to cross reinforce at company level with such small platoons. This is intentionally so. Cross reinforcing under this concept would occur at the task force level. The tank company commander would normally just fight his tanks and be concerned with them and the indirect fire support that they need.

At battalion, we have more possibilities. Since we cross reinforce for virtually all operations, why not do it by organization? In a heavy battalion, we would have two tank companies and one mechanized infantry company. The mechanized infantry company would be slimmed down in a manner similar to the tank company. At battalion, we would have 12 *TOW*'s and would take advantage of their long range fires to provide the overwatch and long range defensive fires that they can provide better than any other system. Our current H-series battalions have provided us a dilemma



Conceptualized Tank Battalion

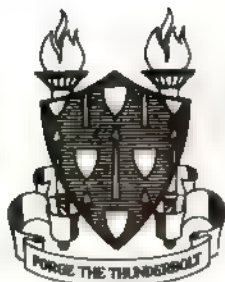
in that both the headquarters company and the combat support company need to operate in the forward portion of the battalion area. Neither is designed to operate with the trains. We end up with an ad hoc arrangement in the trains and two company headquarters forward. Why not organize these two companies functionally? The combat support company would have the S2/3 functions, including the combat support platoons, i.e., three *TOW* platoons, a scout platoon, and a mortar platoon. Notice that I did not say *REDEYE* section or ground surveillance section. These functions would be consolidated at division. The old TOC, with its separate S2/S3 functions, would become a combat operations/intelligence center headed by the S-3. The combat service support company would have the S1/S4 functions. Here we would have an admin/log center again headed by a major, the XO, with combined S1/S4 functions. The service support functions of maintenance, supply, transportation, medical and mess would be in this company. This battalion organization would give us one company CP in the forward area of the battalion and one in the rear. It would also give us an alternate CP capability manned with a field grade officer.

What would a battalion organized as above and designed to be fought at the battalion versus the company level do for us? Hopefully, it would allow our platoons and companies to move about the battlefield with considerably more alacrity than at present. It would remove a degree of complexity from the battlefield for our company commanders and platoon leaders. Does it not add to the level of complexity at battalion level? Perhaps, but the battalion commander is a

more experienced commander and has a staff to help him. Does it not decrease the number of tanks on the battlefield? If it does then we shouldn't reorganize. Only if more battalions are formed should we seriously consider such an organization.

It's easy to design new organizations. It's also very tempting to do so as an attempt to improve effectiveness. An organization such as the above has a number of Army-wide implications and should not be entered into lightly. It is obviously disruptive to have any major reorganization. Before entering into any such change, we would need to carry on extensive analysis and field experimentation to satisfy ourselves that the advantages will far outweigh the disadvantages. Only then would we not be doing ourselves a disservice.





FORGING THE THUNDERBOLT

TELFARE DEVICE

The lifeblood of any tank gunnery training program is the time available for the crew to train as a team. Fiscal constraints, suitable training areas, and limited time are factors facing the Armor commander in conducting effective gunnery training. To this end, the Weapons Department at the U.S. Army Armor School (USAARMS) has challenged each of its instructors to apply their experience and knowledge in developing training devices which will aid the commander in tank gunnery training.

One such device—the *Telfare Device*—bears the name of its originator, SFC Nathaniel Telfare, instructor, Master Gunner Branch, Gunnery Division, Weapons Department, USAARMS. The *Telfare Device* consists of a strap-on mount which accepts the caliber .50 M-2 machinegun with firing solenoid and a single-shot device. The device is designed to simulate main gun firing of tank tables IV—X. Though all caliber .50 ammunition can be used, armor-piercing incendiary tracer (API-T) is recommended.

It is suggested the device be used on a 1/2-scale range using 1/2 full-scale targets. Since the ballistic computer cam has not yet been designed for the caliber .50 round, it is recommended that *HEAT* be indexed in the computer when firing with the device.

Advantages of the device are

- Allows full crew interaction on all types of engagements and allows all tank-mounted weapons to be fired.
- Is accurate to 1,600 meters +.
- Parallax error can be reduced by the use of the traversing and elevating mechanism at the rear of mount.
- No modification is required to the turret or fire controls.
- Uses the M-2 HB turret-type caliber .50 available in all

MTOE armor battalions.

Costs of the device components are

- Single-shot device—\$37.00
- Strap mount—approximately \$600.00, provided that the mounts can be obtained through normal supply channels.

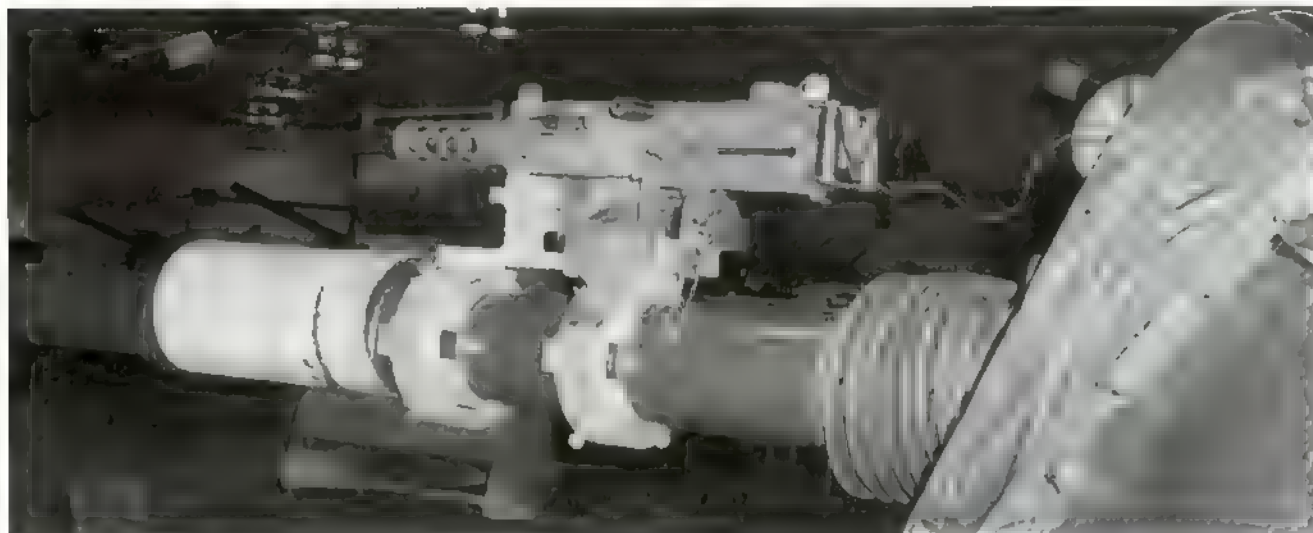
Mounting the device:

- Place the strap on top of 105-mm gun tube about 6 inches to rear of the bore evacuator.
- To prevent the mount from slipping on the gun tube, lock the two locking bolts in place on both bottom straps.

Boresighting and zeroing the device:

- Boresight the 105-mm gun using normal procedures found in TM 9-2350-215-10
- Insert the caliber .50 boresight device into the muzzle of the machinegun. Then, by moving the traversing and elevating mechanism at the rear of the mount, move the caliber .50 to same aiming point as that of the 105-mm gun.
- Zeroing procedure is the same as that used for zeroing the main gun, as outlined in TM 9-2350-215-10.

The *Telfare Device* is just one of many tank gunnery devices developed by the instructors in the Weapons Department to aid gunnery training. The expertise required to make this device can be found in any of our Armor units. The Armor Community is in great need of cost-saving training techniques and devices to enhance our gunnery as well as other training. If you the reader have a good device, gunnery or otherwise, that can help accomplish the training mission, submit an article for publication in *ARMOR Magazine* so that the rest of the world can find out about it. Effective training is the keystone to battlefield success and must be advanced at every opportunity.



ANOTHER USE FOR THE M-55 LASER

For many years the Armor Community has been feverishly searching for ways to train tank crews to perform all firing duties and shoot accurately while conserving expensive ammunition. Short training time in major training areas where each unit must wait in line to take advantage of the training facilities allocated is also a concern.

In order for a unit to be proficient in gunnery, it must have a year-round gunnery training program that is effective, attractive, and offers practical exercises which can be performed in garrison, during the conduct of field training exercises, or as concurrent training in major areas.

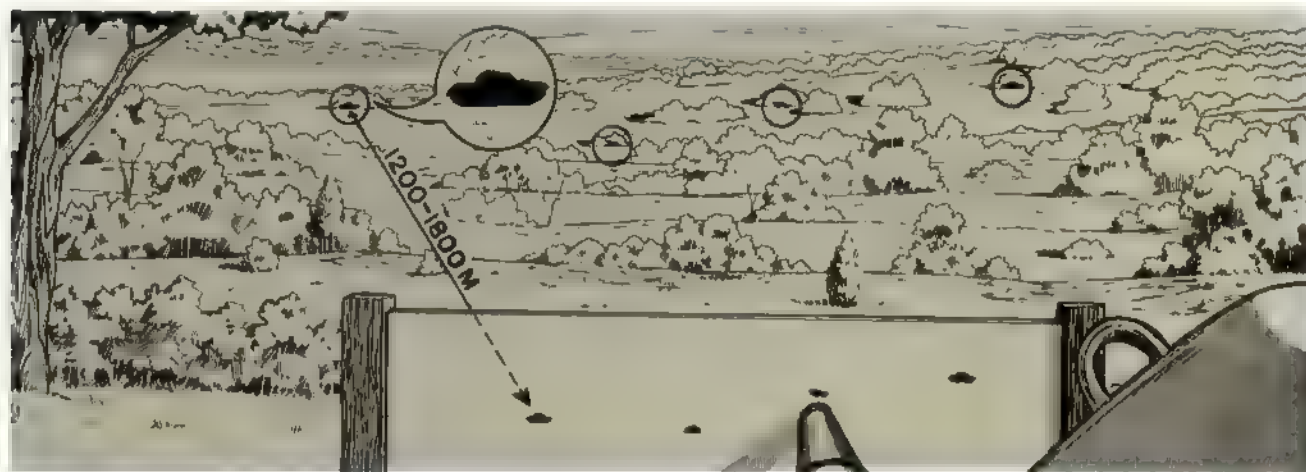
Many types of gunnery devices have been developed, some very expensive, others not so expensive. None of

one representing a target down range that the tank commander may decide to engage

To zero the system, the tank commander selects a target and directs the gunner to lay on it. He ensures that the proper ammunition is indexed in the ballistic computer and range to the target is correct. With the laser in the continuous mode, the gunner depresses the electrical trigger. A crewman on the ground then positions the 1/2-inch silhouette on the magnetic board so the laser beam is centered on it. After all the 1/2-inch silhouettes have been properly positioned in the same manner, the crew is prepared to conduct the exercises.

The laser is changed to the flash mode and connected to the main gun electrical wire (113C) at the main gun safety.

During the exercises both tank commander and gunner, looking through their respective sights, will be looking over



these devices, however, require the *complete* interaction of the crew in the performance of firing duties to obtain simulated target destruction.

A laser technique has been developed at the U.S. Army Armor School to train the tank crew effectively in acquiring and dry firing on various targets at different ranges, using different types of ammunition. The system can be used to train *M-60A1*, *M-48A3*, and *M-551* crews. An additional feature of the system that is not found in other current training systems, requires the tank commander to range accurately on the target to obtain a hit.

Items needed are the M-55 laser, coaxially mounted; a free standing magnetic board (2 x 7 feet, covered with Scotchlite or painted with white enamel, capable of being adjusted from 6 to 9 feet in height), and an assortment of targets at varying distance downrange.

To range accurately, the tank commander must perform all steps of placing the rangefinder in operation, including target image coincidence (TIC) adjustment.

The magnetic board must be set up at the muzzle of the gun and adjusted in height so the top edge of the board is above the muzzle of the gun, but not so high that it interferes with the line-of-sight of the gunner's periscope or the tank commander's rangefinder.

Various 1/2-inch silhouettes are placed on the board, each

the top of the magnetic board at the target being engaged downrange.

After all crew firing duties have been properly performed, including the loading of a dummy main-gun round and placing the safety in the *FIRE* position, the gunner lays on a target downrange, depresses the electrical firing trigger, and the laser beam strikes the corresponding silhouette on the magnetic board.

If any of the crew firing duties are not performed properly, i.e., incorrect range, incorrect ammunition, gun switch or loader's safety switch in the *SAFE* position, a target hit will not be obtained.

This system is most effective for training new gunners after the completion of subcaliber firing tables. During the conduct of the exercises, the gunner will be unable to sense the strike of the laser beam. This requires the tank commander to issue a subsequent fire command after each round is fired, giving him excellent training in adjustment of fire through the use of subsequent fire commands.

The system can be used in testing tank crews and is an excellent way to practice firing from range card data.

Known as the Stout Device, the system bears the Fort Knox identification number FKD 17-29-6. Specifications for fabrication of the magnetic board and 1/2-inch silhouettes can be obtained by writing to TASO, Fort Knox, KY 40121.

Organize a Mechanized Force



by Colonel (Retired) H. H. D. Heiberg

“Organize a Mechanized Force. CPS.” In 1929, this directive, scribbled on a pink slip of paper by Army Chief of Staff, Charles P. Summerall, ended up for action on the desk of Lieutenant Colonel Adna R. Chaffee, Jr. in the G-3 Section of the War Department General Staff.

Since the abolishment of the Tank Corps of World War I by the National Defense Act of 1920, all arms and services had been independently expanding the use of motorized equipment for transport or prime mover. The British, on the other hand, had continued the development of a faster tank following World War I and were experimenting with a fast moving, hard striking mechanized force to perform cavalry missions. While visiting England in 1928, Secretary of War, Dwight F. Davis witnessed a demonstration of this combined employment of tanks with supporting mechanized units and was so impressed that, upon his return to the States, he directed that steps be taken to develop a similar force for the United States Army.

Though no previous study of role, mission or organization had been made by the War Department, there was soon assembled at Camp Meade, Maryland, a heterogeneous collection of practically every item of equipment in the East that had a motor in it. Some 6-ton *M-1917* (U.S. *Renault*) and *Mark VIII* tanks, French 75's in Liberty trucks, infantry in more Liberty trucks and truck-drawn 3-inch antiaircraft guns were assembled. The force lasted approximately a month.

The War Department G-3 then initiated a study of the role and mission of a mechanized force, based on the latest mechanical developments. This study established one cardinal principle that tanks cannot be used independently, due to their apparent deafness, partial blindness, and lacking capability for prolonged defense. The study went on to say that the tank was a powerful offensive weapon that must be the backbone of any mechanized force. Give it airplanes and fast reconnaissance vehicles for eyes and ears, mobile artillery support, and troops in mobile carriers to consolidate positions and hold the ground the tank has gained through

assault; then you have a balanced mechanized force.

Tentative tables of organization and equipment were drawn up with plans initiated to assemble another experimental force in the summer of 1932. The purpose was to evaluate the equipment that was then available. Unexpectedly, just before he retired as Chief of Staff, General Summerall issued one last directive: “Assemble that mechanized force now, October 1931. Station it at Camp Eustis, Va. Make it permanent not temporary. CPS.”

Accordingly, another hasty assembly was ordered, this time at Camp Eustis in Tidewater, Virginia. Troop A, 2d Armored Car Squadron, Cavalry, was already organized there. A company of 6-ton tanks, porteed in Liberty trucks, motorized infantry, field artillery, antiaircraft artillery and service and supply elements rounded out this force. Selected to command this detachment was Colonel Daniel VanVoorhis, a strict disciplinarian and an exponent of “Spit and Polish.” Determined that this should not become an outfit of grease monkeys, Colonel VanVoorhis required that men and equipment always be smartly turned out. In true cavalry tradition, following each day's use, every vehicle was washed and fueled before being stabled.

General Douglas MacArthur, who succeeded General Summerall as Chief of Staff, upon being briefed on the Mechanized Force and the War Department study, issued a directive which prescribed that, “Mechanized Cavalry will be organized to fulfill the normal cavalry role, substituting the vehicle for the horse.” It further provided that the first stage of this development would be the mechanization of one horse cavalry regiment. The term “combat car” was coined for the cavalry tanks to circumvent the National Defense Act which assigned the tank and tank employment to the Infantry.

Because of the low, swampy terrain of Camp Eustis, a group of officers headed by Colonel VanVoorhis made a quick tour of the various available military reservations to determine where the mechanized cavalry should be located. Camp Knox, Kentucky, a summer training camp comprising

almost 70,000 acres, was selected principally because of its size, varied terrain and proximity to the automotive industrial area.

With a new station decided upon, the Mechanized Force was disbanded at Eustis and a cadre selected for movement to Camp Knox in November 1931. Designated the "Detachment for Mechanized Cavalry Regiment," this cadre consisted of Troop A, 2d Armored Car Squadron; 19th Ordnance Company, Company D, 34th Quartermaster Regiment, and a Headquarters Troops which included a platoon of infantry tankers as well as Signal Corps and Medical Corps personnel. Colonel VanVoorhis was designated as commander with Lieutenant Colonel Chaffee as his executive.

The equipment brought to Camp Knox included two six-wheeled, four-wheel drive (6x4) Cunningham armored cars, which were the first of 20 ordered for the Cavalry. They had chrome trim, including wheel rims, were upholstered in real leather and boasted electric fans, heaters, ash trays and cigar lighters. Next came the "Mosquito Fleet" of five blacksmith-fabricated boilerplate bodies on Chevrolet, Plymouth, and Pontiac chassis. There were two LaSalle armored cars and last, but the most mobile of them all, were two crudely fabricated, rugged 4x4 Franklin armored cars, built by the Quartermaster Corps and powered by Franklin air-cooled engines. These 11 armored cars comprised the entire armored combat vehicle strength of the detachment. The bulk of the troops rode in 1-ton, 4x4 Franklin personnel carriers, built by the Quartermaster Corps with the same components as the Franklin armored car. In the trains were 4x2 Liberty trucks, WWI veterans modernized in the Holabird shops by adding pneumatic tires and a more modern six-cylinder Continental Red Seal engine. There were also a few 1½-ton, 4x4 Marmon-Harrington trucks, and various service, shop, and maintenance vehicles. Each troop also had a number of motorcycle scouts mounted on Harley-Davidson motorcycles.

Christie Combat Car Arrives

Following a period of rehabilitation of housing and the construction of vehicle shelters, the efforts of the detachment were directed toward tactical organization and training. A machinegun platoon was organized and mounted in Franklin personnel carriers with two caliber .30 water-cooled machineguns and crews in each carrier. When the first Christie combat car arrived in February 1932, a combat car platoon was also organized.

Eleven tons of sleek armor with a manually rotated turret mounting a 37-mm gun and coaxial air-cooled caliber .30 machinegun, the Christie was an impressive vehicle, second only to the Cunningham in the esteem of Colonel VanVoorhis. Through the spring, two more of these combat cars were delivered and in the summer, the fourth arrived after having suffered modification at the hands of the Ordnance to incorporate an air-cooled caliber .50 machinegun in place of the 37-mm cannon in the turret.

Much of this first year was devoted to the development of small unit organization and tactics. Concurrently, the procedures for operation and maintenance of mechanized equipment were being evolved, for though the cavalryman was thoroughly indoctrinated in the necessity for care of his mount, the needs of a mechanized mount were vastly different from those of a horse. All personnel attended

motor maintenance schools, and courses were established to train other specialists, particularly radio operators who had to learn codes as well as maintenance.

Around Christmas time in 1932, the truck transportation elements of the mechanized cavalry detachment at Fort Knox was organized into two echelons and departed for Fort Marfa, Texas for the purpose of transporting the 1st Cavalry Regiment back to Fort Knox. (*Camp Knox had been designated as a Fort earlier in the year. Ed.*)

1st Cavalry Assigned to Fort Knox

Included in the convoy returning to Fort Knox were personnel and their families who were making the trip by private automobile. This element of the unit was organized as a third serial of the convoy and received the same maintenance and refueling service as the other serials.

Among those making up the third serial was the Lee Dot family, "Memorandum Receipt Chinamen," who had operated the Post Restaurant at Fort Marfa and who were to open a Chinese restaurant at Fort Knox. The Dot family, like other Chinese-Mexicans who had helped General John J. Pershing during the punitive expedition into Mexico in 1916, had been unable to enter the United States when the campaign ended due to immigration limitations on orientals. In order to circumvent this restriction and provide protection against reprisals by Villa sympathizers, these Chinese-Mexicans were granted asylum on U.S. military reservations. And, since the Post Quartermaster became their custodian, they became known as "Hand Receipt Chinamen." Many years later, Congress granted citizenship to these refugees and released them from their restriction to military reservations.

In January 1933, the movement of the 1st Cavalry (Mecz) to Knox was completed and its personnel began a period of indoctrination and training in driving, maintenance, tactics, and techniques of mechanization. But the vehicles to equip the augmented troop strength were not forthcoming at this time. Fort Knox had been tasked to staff the Civilian Conservation Corps (CCC) in Kentucky and Indiana, leaving barely enough troops to care for the limited equipment on hand.

In spite of these diversions, development of the mechanized regiment continued. A Chemical Mortar Platoon (Mecz) was assigned to the unit and attached to Headquarters Troop. These 4.2 inch mortars were mounted on Ford truck chassis so that they could be quickly dropped into firing position behind their carriers. The platoon was to be employed principally to lay smoke screens. The *T-1* half-track was delivered for tests as a cross-country personnel carrier. As the result of these trials, an order for 30 improved versions, designated half-tracks, *T-1E1*, was placed to fill the requirements of the Machinegun Troop. The delivery of the order for 20 *M-1* armored cars continued at the rate of one or two a month. But no combat cars were forthcoming because no pilot vehicle had been built for testing and evaluation. The original combat car platoon still equipped with four Christies remained intact as part of F Troop. Elsewhere in the Combat Car Squadron, the ubiquitous Franklin personnel carrier, carrying a 37-mm cannon and its crew, was used as a substitute for the combat car and was adorned with two wide, yellow strips to identify it as such.

After many false starts, Ordnance finally began working on a pilot combat car at Aberdeen Proving Ground, Maryland. Under the guidance of a cavalry officer, Captain Joe Colby, the *T-4* combat car finally took shape. Weighing just under 10 tons, the 20 horsepower-per-ton ratio provided neither the agility nor the speed of the Christie, but the power train design promised much greater mechanical reliability.

While the *T-4* was still under development, the War Department imposed a 7-ton weight limit on cavalry vehicles.

The *Light Tank T-2* was on the drawing boards at this time, so Ordnance started parallel development of the *Combat Car T-5* at Rock Island Arsenal, Illinois. This was a non-convertible, full-tracked vehicle, and rode on four volute-spring loaded, two-wheeled bogies. It was claimed that the short-pitch, rubber-bushed track with rubber treads, and the light weight of the *T-5* precluded the need for the convertible feature. It employed the same engine as the *T-4*, souped

"...the bogey suspension and divided power train were adopted at the War Department level by officers who probably had never ridden in a tank, much less fired from one."

up to 250 h.p., and a similar transmission, but the engine was mounted in the rear and the transmission in the front requiring them to be connected by a drive-shaft enclosed in a tunnel that bisected the crew compartment at a height of about 2 feet. Because of this obstruction, two turrets mounted side by side were used, one mounting a .50-caliber machinegun and the other a .30-caliber. The 37 horsepower-per-ton ratio promised cross-country performance better than that of the Christie.

Early in 1934, rumors were confirmed that there would be maneuvers between the 1st Cavalry (Mecz) and the Cavalry School Brigade at Fort Riley, Kansas in late spring. All efforts of the command at Fort Knox were directed toward preparation for this first real test of the doctrines and training that had been 2 years in development.

To test and demonstrate the strategic mobility of the mechanized regiment, the movement to Fort Riley was made over the road. The terrain at Fort Riley was almost ideal for both horse and mechanized, and each exploited its mobility to the utmost in the maneuvers. The long, heated arguments lasted well into the night following each exercise. Yet, despite his loyalty to the horse, the cavalryman knew deep in his heart that mechanization was in ascendance and the horse in decline.

Following the maneuvers, a demonstration was staged to compare the *T-4 combat car*, shipped in from Aberdeen, with the *T-5 combat car*, from Rock Island. Before the assembled students, staff and faculty of the Cavalry School, representative of the 1st Cavalry (Mecz) and observers from the War Department, these vehicles maneuvered over varying terrain, even descending some of the steep slides

that it was thought only a horse could negotiate. The *T-4* with a longer track base and Christie suspension, was superior in ditch crossing and provided a more stable gun platform. But the *T-5* with its high power-to-weight ratio and short track base, handled like a polo pony and out maneuvered the *T-4* over most terrain. Its double turret was not favorably received, however, and its choppy motion when moving cross-country made accurate marching fire impossible. The consensus of the observers at the operational level favored *T-4* with some reservations, but at the staff levels, particularly among the War Department representatives, the 7-ton weight and lower cost of the *T-5* were regarded with favor.

In the fall of 1934, a modified *T-5* was standardized by the War Department as the *M-1 combat car*, and an order was issued for production to equip the 1st Cavalry Regiment (Mecz). Thus, with only the brief "service test" at Fort Riley for comparison, the bogey suspension and divided power-train were adopted at War Department level by officers who probably had never ridden in a tank, much less fired from one. These features were destined to remain characteristics of all U.S. track-laying vehicles until the individual wheel suspension and unit power package were reintroduced on the *M-24 light tank* and the *M-26 medium tank* late in World War II.

After the regiment returned from the Riley maneuvers, the 1st Battalion, 68th Field Artillery (Mecz) was mobilized at Fort Knox to support the 1st Cavalry (Mecz). Initially truck-drawn, this outfit was soon equipped with half-track *T-51* prime movers, which greatly improved cross-country mobility of its headquarters and two batteries of 75-mm towed howitzers.

Up to this time, the regiment had retained the troop organization of the depression-era skeletonized cavalry regiment from which it originated. But based on the lessons of the Riley maneuvers, it was decided that an additional combat car troop was needed. So, early in 1935, Troop C was organized with the old Christie platoon as its nucleus, with the author in command.

In March 1935, the first of the new order of *M-1 combat cars* arrived at Fort Knox, the artillery also began receiving *M-2 scout cars* for use by its reconnaissance elements and forward observers.

Now at full strength, including a band, and completely equipped, the mechanized regiment and artillery battalion were preparing to take part in maneuvers to be held in the Allegan Maneuver Area in Michigan during the summer of 1936. One of the preparatory exercises was a route reconnaissance to the maneuver area made in the spring by a detachment of representative vehicles of the command. The vehicles performed excellently over the road enroute and off the road in the maneuver area, and data on rates of march and fuel consumption were obtained. As the weather warmed up in the late spring, however, vapor-lock raised its ugly head in the fuel system of the new combat cars. Many modifications, changes, and expedients were tried, but the problem was not licked that summer. So 5-gallon desert water bags became standard equipment on every combat car for supplying cool water with which to drench the vapor-locked fuel system.

Based on the route reconnaissance, it was planned to make the 400-mile march to Allegan in two stages. After

covering about 75 miles on the first hot August day of the march, bogey tires began to explode. When a long halt was made at noon for refueling, the column was about 120 miles from the day's campsite. The combat cars began running out of fuel before reaching camp. The march ended that day with only two combat cars of the 1st Squadron and one of the 2d Squadron still moving with the column. The others straggled in later, having picked up more fuel from the trains.

The next day, another brand of bogey wheel tire began separating from the rim and peeling off in large chunks. By this time, all the spares had been used up, so the combat car crews would stop long enough to take the axes from the vehicle pioneer equipment, chop off the rest of the tire and continue the march on the rim. When the column finally coiled in the maneuver area, the morale of the troops, hot and tired after two hard days on the road, was pretty low. Things quickly improved, however, when the band struck up "The Beer Barrel Polka" as a truckload of cold beer rolled into sight.

During the maneuvers, the combat cars performed very well and more lessons were learned and experience gained by the mechanized units. Additionally other segments of the Army also learned about this new mechanized force through personal observation of it in action.

In the month following the Allegan Maneuvers, the 13th Cavalry Regiment under command of Colonel C. L. Scott, arrived from Fort Riley, Kansas for mechanization. Thus was created the 7th Cavalry Brigade (Mecz). The 68th Field Artillery (Mecz) was increased by two batteries of truck-drawn 75-mm howitzers to provide firepower for the additional regiment. A brigade headquarters troop was also organized. There ensued another period of reorganization, training, and equipping.

Late in 1936, the *M-3 scout car* was completed. This incorporated a gunmount developed from the U.S. Army Air Corps flexible mount. It consisted of a rail encircling the crew compartment on which rode three skate mounts which could be quickly moved and locked at any point on the rail. As the cross-country performance of the armored cars and half-tracks had been disappointing because their front wheels were not powered, it was decided to adopt the *M-3 scout car* as both a reconnaissance vehicle and personnel carrier for the 13th Cavalry.

Colonel Von Schnell of the German Army visited Fort Knox to study our mechanized doctrine and equipment in the summer of 1937. Upon his departure, he made this statement: "I know well and have ridden in all foreign tanks. Your Cavalry combat car has more speed, more power and is easier riding than any European light tank. I consider it equal to the best in Europe."

In June 1937, the 12th Observation Squadron, Army Air Corps, less one flight, was attached to the mechanized brigade at Fort Knox. A technique of communication and control between ground and air to coordinate the respective reconnaissance efforts was soon worked out. Some time later, these techniques were applied in directing combat aircraft in close support of ground troops using planes of the 12th Observation Squadron flying simulated attack missions on call from the mechanized force. Thus was evolved the system of calling in close air support that was used by Armor throughout World War II.

After the 13th Cavalry had received most of its equipment

in the spring of 1938, the brigade made a shakedown march to Fort Oglethorpe, Georgia. This was in preparation for the maneuvers scheduled that fall at Fort Riley, Kansas. This time it would be the mechanized brigade against the horse regiment.

Colonel Adna Chaffee had now returned to Fort Knox to command the 1st Cavalry Regiment (Mecz). The march to Riley was made over the road with vehicles from which vapor-lock and bogey tire troubles had been eliminated. So, with few mechanical problems to plague it, the 20 miles of march column, moving in three echelons, completed a routine trip. In comparison to the first such trip, this was a great tribute to the research, development and training efforts that had gone into the intervening 4½ years. No longer was there any doubt, except in the minds of the most sentimental horsemen, of the future of mechanization.

On the return trip to Fort Knox, the brigade camped for the night in a park in Kansas City. Here, before the massed standards of the command, orders were read promoting

"Things quickly improved, however, when the band struck up 'The Beer Barrel Polka' as a truckload of cold beer rolled into sight."

Adna R. Chaffee to Brigadier General commanding the 7th Cavalry Brigade (Mecz) and Fort Knox, Kentucky.

General Chaffee's first acts when the brigade returned to Fort Knox was to create the Mechanized Cavalry Board with Lieutenant Colonel Jack W. Heard as its president. Up to that time, most of the development of mechanized equipment had been initiated by the technical services as a result of real or assumed requirements. If any service testing was done, it was performed by a line organization in addition to its other duties, often in a haphazard manner with sketchy documentation. The Mechanized Board initiated an orderly system of establishing requirements, consultation with the technical service on design and; finally, testing, modification, and selection of a prototype, much in the manner of the Armor Board today. Because the Mechanized Board was small, service testing was still performed by line organizations interested in the equipment, but under the supervision of a Board project officer. This Board played a major part in the development of the mechanized equipment with which our armored units entered World War II.

The next goal of the Mechanized Brigade was its participation in the First Army Maneuvers scheduled in the Plattsburg Maneuver Area, New York, for August 1939. For reasons of economy in maneuver funds, the brigade loaded its tracked vehicles and the towed howitzers and their half-tracked prime movers on flat cars for rail shipment to the maneuver area. The following day, the 1st Mechanized Brigade started its road march to the Plattsburg Area with all its wheeled vehicles, including the trucks carrying the tracked

(continued on page 48)

Pages from the Past

LOGISTICS

When the infantry firing line shall have worked its way through the jungle or the chaparral or the swamp or over the level ground to within striking distance in the great battle to be fought in our next war, the men will have expended about all of their ammunition by the time they reach the works of the enemy and make their lodgement. Then we shall be met by the old, old problem of how to supply that line quickly with more ammunition. It is a problem as old as the bow and arrow, probably older. When the first two men engaged in their first fight, one of them threw stones and the other used a club. The club broke, or the stones were all thrown, and the fellow who got out of ammunition was beaten. There were plenty of stones near by—but not within reach; and so the fellow who was out of ammunition was licked, as he has been ever since.

**The Cavalry Journal
July 1903**

NONCOMMISSIONED OFFICERS

The noncommissioned officers are the backbone of the American Army. It is important that they develop genuine respect for their positions and pride in their status. The commander will encourage initiative, self-respect, and develop leadership among NCO's by frequent conferences with them and give them definite responsibilities for the training and combat action of the men under them. He will insist that they exercise their authority properly and then support them fully. The ultimate goal is a group of NCO's who will always be glad to obey when obedience is called for, and who are capable of taking the initiative when the occasion demands such action.

**The Cavalry Journal
July-August 1945**

TO THE 1ST CAVALRY DIVISION

This is an unofficial commendation. It is not from the War Department in recognition of deeds of valor and bravery on the field of battle. It does not authorize the wearing of a ribbon or medal, but you can be just as proud to receive it as if it did.

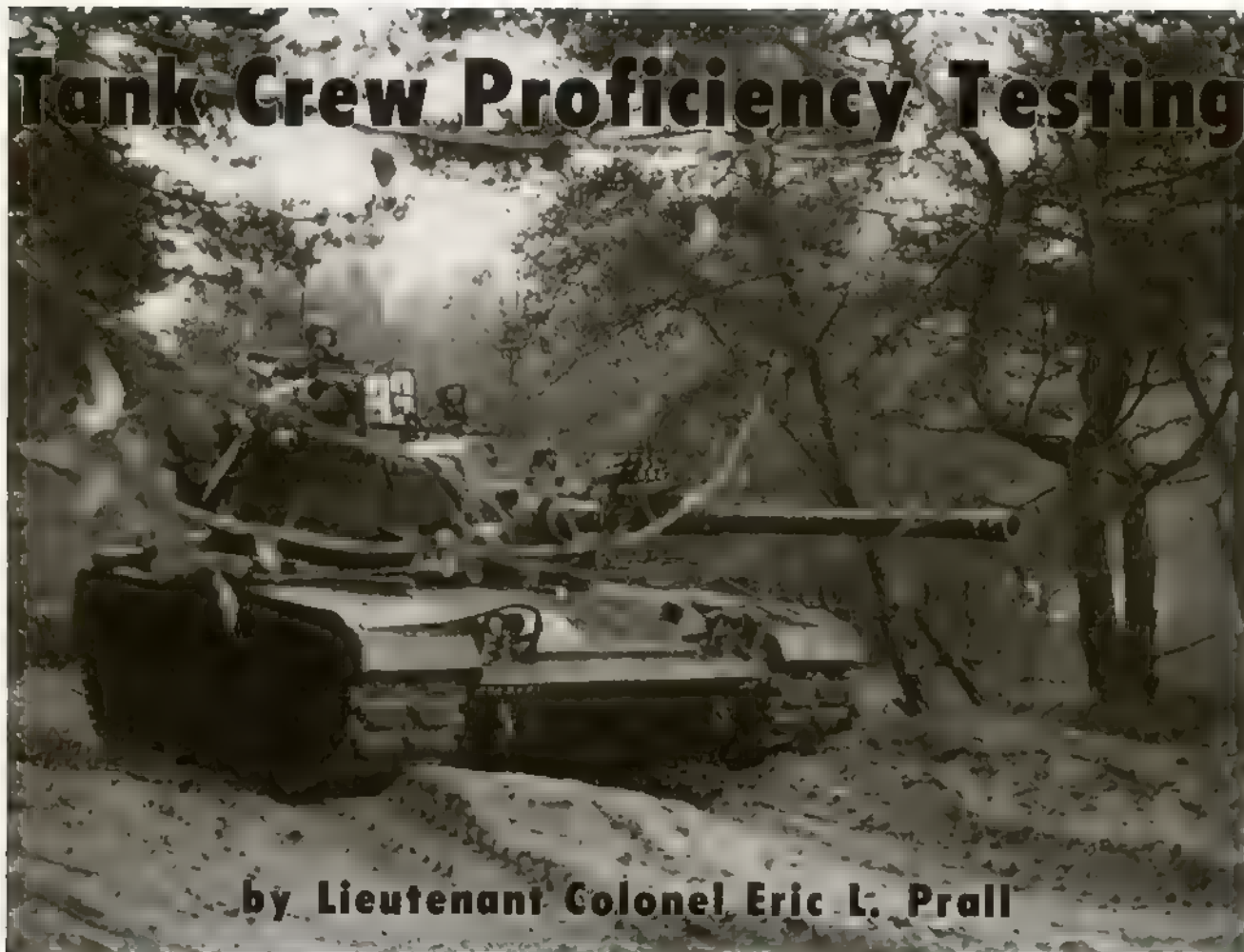
It was written by Reverend Father Hurley in a letter sent home after his liberation. For three years he was the "strong man" of Manila, defying the Japanese in their efforts to oppress American citizens. Although he protests that he is still the same hard-boiled, unemotional man, his tribute to you of the 1st Cavalry Division speaks for him. It also expresses the thoughts of every other man, woman, or child who was liberated from Jap cruelty and torture by your brilliant and daring dash into Manila.

In what better way could be answered the war-old question—"Why do we fight?" than by the following words of Father Hurley, extracted from an article published in the Jesuit Mission Magazine for April 1945, by Reverend Father Calvert Alexander (S.J.)?

"God bless all Americans, but especially the magnificent 1st Cavalry Division—which made this brilliant and daring dash into Manila. No words of any living man could possibly exaggerate the magnificent character of our deliverers. Of course, they are big, muscular, hard-as-rock, magnificent specimens, but that, of course, is taken for granted. The feature that has impressed us all—swept us off our feet and put these men in our hearts forever—is the unbelievable kindness, consideration, thoughtfulness, gentleness, tenderness toward us."

**The Cavalry Journal
July-August 1945**





by Lieutenant Colonel Eric L. Prall

Much has been written about the generally accepted belief that tank crews in the U.S. Army are not well trained. This sad state of affairs can be attributed to any one or a combination of the items listed below

- Volunteer Army concept.
- Armor doesn't get its fair share of smart guys.
- Crew turbulence.
- Shortage of trained and older NCOs.
- Lack of repair parts.
- Training distractions facing commanders
- Lack of maneuver areas
- Lack of fuel, ammunition, etc.

This listing is not all inclusive, but each item listed could be used (and many have been) as the basis for an article showing how to overcome that particular problem and have better trained crews. However, one of our real shortcomings is that we don't know how to measure the proficiency of a tank crew. Some sort of evaluation procedure is necessary to measure the state of training (proficiency) of the tank crew. Without an accepted evaluation procedure, training cannot be properly focused and thus improved

An extensive search of the literature on tank crew training and evaluation revealed many different types of tests that have been developed and used by troop units or by research organizations. But none have seemed to catch on and become an accepted part of our training doctrine.

This article will present some concepts that should be considered in the development of any training evaluation or

proficiency test. Although there is nothing really new in the concepts, they are frequently overlooked when evaluation tests are prepared.

There are four different goals that may be the focal point of an evaluation program. These four goals form a rough hierarchy and are called objective levels (OL). The goals or objective levels are defined below.

The goals are to determine if the individual (or unit) being tested:

(OL-1) Can achieve required standards on specified tasks.

(OL-2) Knows the stimuli that prompt the need for the task to be performed.

(OL-3) Recognizes the stimuli in a field environment.

(OL-4) Properly performs the task required when stimuli occur in a field environment.

While the meaning of the various objective levels is somewhat self-evident, a detailed explanation will serve to clearly define the concepts.

The first objective level is the focal point when we attempt to measure, by performance based testing, the individual undergoing basic training. The basic trainee is told, "At this station you will demonstrate your ability to disassemble the M-16 rifle." Qualification firing, both individual and crew served weapons, also focuses on this objective level.

The second objective level is frequently the focus of service school evaluation of a student's knowledge of tactics or his leadership ability in a classroom environment. A situation is described and the student is asked—"What are your

actions?" By his response, we try to determine if he recognizes the stimuli that require him to take specific actions. Frequently, we lose sight of the fact that it is his recognition of the need for certain actions with which we are really concerned and tend to grade him on the form of his response or how well he did the task, e.g., "Was the order complete?"

The third objective level is not generally the focal point of any present evaluation and training program. A possible exception is maintenance training of junior officers where indicators of maintenance deficiencies are taught. Tactical walks could be developed that focus on this objective level. It appears that this objective level is ripe for exploitation to improve tactical skills.

The crew that can only shoot is not near as effective as the crew that can maintain, move, communicate, and SHOOT!

The fourth objective level is the focal point of most testing or evaluations done in a field training exercise (FTX) environment. This objective level is more complex to consider. Implied in the definition of this objective level is the need for the person being tested to decide which task to perform first. In the case where crews or units are being evaluated from the viewpoint of the fourth objective level, the decisions by the leader are critical to successful performance by the unit. The evaluation criteria is also more difficult to develop. The sequence or priority in which tasks *should* be performed must be specified by doctrine and not by the opinion of the evaluator at the scene. Of course, the task must be performed to the required standards.

Recognition of the different objective levels of evaluation leads us to carefully consider the objective level towards which one should focus in evaluating tank crews.

A project underway at the TRADOC Combat Arms Test Activity (TCATA) to develop measures of effectiveness for tank crews has approached the problem from the viewpoint of what a platoon leader or company commander should expect a tank crew to be able to do. The tank unit commander expects each tank crew to **MAINTAIN** the tank so that the tank-crew system can **MOVE, SHOOT, COMMUNICATE, SEE, and SURVIVE** throughout the entire range of tactical missions that the tank unit is designed to accomplish. In addition, he expects the tank crew to perform these functions *effectively* with a minimum of detailed instructions. Within each of the functional areas, there are a large number of tasks that may be identified. Following are types of tasks in each functional area:

MOVE: This function includes all tasks that involve

moving the tank; e.g., navigation, fording, and vehicle recovery techniques.

SHOOT: This function includes hitting identified targets at various ranges with the right weapon systems.

COMMUNICATE: This function includes all means of communication from or to the tank. It includes visual, wire, and radio means.

SEE: This function includes, but is not limited to, target detection and identification. Preparation of range cards, clearing fields of fire, sensing fires of other weapons, and use of night vision equipment are all part of this function.

SURVIVE: This function includes those tasks that help prevent the destruction of the tank. The tasks include ATGM counterdrills, selection of positions, selection of routes, camouflage, establishing local security, mine warfare, extinguishing tank fires, and preparing the tank for a friendly nuclear strike.

MAINTAIN: This function has three major subdivisions: preventive maintenance tasks, including adjustments; troubleshooting and field repair, and logistical actions (stow ammo, rations, fuel, etc).

Does adding three functions to the familiar move, shoot, and communicate functions really contribute anything to the understanding of the tank crew performance requirements? It does. Failure to be able to perform any of these functions should predict a crew that would not be able to pull its load in the platoon. The crew that could only shoot would not be as effective as a crew that could perform effectively in all functional areas.

We need to be able to measure the performance of a tank crew in each of the six functional areas. The primary evaluation tool for tank crew proficiency currently used is tank qualification firing (Table VIII). Table VIII is focused on objective level 1. It appears that what is needed are measures in the other 5 functional areas that are also focused on objective level 1. These measures would take the form of county fair or fixed station tests: "At this station you will demonstrate your ability to prepare a range card." The development of such a test is fully within the capability of any tank battalion. Many such tests have been used by various tank battalions. One of the possible reasons that such tests are not widely used is the guilt feeling that the tests are not "realistic." But, by recognizing the objective levels described in this article, the guilt feelings may be relieved.

In summary, to develop a test to measure tank crew proficiency one should do so from a viewpoint that:

- Focuses on those tasks that the tank unit commander should expect each crew member to be able to do
- Includes measures in each of the functional areas of **MOVE, SHOOT, COMMUNICATE, SEE, SURVIVE, and MAINTAIN.**
- Focuses on objective level 1.

Once objective level 1 measures are developed and standardized for all functional areas, further development into the higher objective level testing would follow.

The project at TCATA to develop improved measures of performance for tank crews has made use of the concepts discussed above. The tank crew's proficiency depends on a combination of individual skills and crew cooperation. The tank commander is the central figure in obtaining this cooperation. The ultimate value of the crew-tank system also depends on the tank itself. The tank design as well as its

state of maintenance and adjustment are important factors in determining the value of the crew-tank system. The value of the crew-tank system will not be a constant, but will vary over time. Crew proficiency testing does not attempt to measure this overall value of the system as must be done in comparing tanks of different designs. While the condition of the tank (maintenance and adjustments) is, to a large degree, a function of the crew's proficiency, it is also a function of the unit commander's actions at all levels. The contribution of higher commander's actions to the condition of the tank probably exceeds the contribution of the crew. Merely assessing the mechanical condition of the tank is not a valid measure of crew proficiency. Nevertheless, there are certain maintenance skills that the crew must possess. Any attempt to evaluate a tank crew must include some measure of these maintenance skills.

Crew proficiency must build upon individual skills. Individual skills are measured by skill qualification tests (SQT). The proposed integrated test procedure makes use of SQT as an input into the evaluation.

The framework for the evaluation procedure is eight modules. The modules, the functional area measured, and the testing objective level are shown in table 1. Each module is self-contained. A crew could be tested in one or more modules during a single day. The modular framework increases the scheduling flexibility for the tank battalion wishing to evaluate its tank crews. It is emphasized that these eight modules reflect current thinking and may be revised as the project proceeds.

A brief description of each module follows:

Module 1—*SQT*. Based on the soldiers' manual, each crewman would be tested in appropriate skills from appropriate functional areas.

Module 2—*Preparation of Tank for Combat Operations*. Time to complete various phases, accuracy of adjustments, completeness, and following of proper procedures would all enter into the evaluation.

Module 3—*Obstacle Course*. This module would include obstacles close to the limit of tank design. Successful negotiations and proper procedures would enter into the evaluation.

Module 4—*Target Acquisition and Recognition*. Several different innovative devices are being explored for use in this module. Slides, pictures, movies, and actual vehicles all could be used. Time to detect would be the primary measurement of proficiency.

Module 5—*Road March*. The tank crew will operate the tank in a road march. Proper interval, speed and alertness of the crewmen will be among the measurements used to evaluate proficiency. A maintenance stop will be part of this module. The number of checks the crew makes compared with the number that should be made will be one measure used to assess during-operations maintenance proficiency. Note that the maintenance proficiency in this module is being focused on testing objective levels 3 and 4.

Module 6—*Qualification Firing* (Table VIII or successors).

Module 7—*Tactical Skills*. This module is a tank crew FTX. The evaluation is based on observations of experienced evaluators. One should only expect gross results—poor, fair, good. Objective level 4 is the focal point of this module. The results in this module will necessarily be less precise than the other modules. But, if the evaluator is good

and the FTX well conceived, it is possible that the results will be more accurate.

Module 8—*Section Battle Run*. This module is the new Tank Tables IX and X. These tables approach tank firing from a more "realistic" viewpoint. Initial information on the design of these battleruns show that the potential to measure performance in functional areas other than SHOOT exists. This potential should be exploited. The (X) shown in table 1 indicates this potential.

TANK CREW PROFICIENCY TESTING CHART							
MODULE	MOVE	SHOOT	COMM	SEE	SURVIVE	MAINT	OBJ LEVEL
1—Indiv Skill							
Tests	X	X	X	X	X	X	1
2—Prep of Tank						X	1
3—Obstacle Course	X						1
4—Target Detection				X			1
5—Road March	X		X	X		X	1, 3, 4
6—Range Firing							
Table VII		X					1
7—Tactical Skills							
Crew FTX	X	X	X	X	X	X	4
8—Live Firing							
Sec Battlerun	(X)	X	(X)	(X)	(X)		1, (4)

Table 1. Functions and objective level by module.

This presentation of the concept and framework developed at TCATA to evaluate tank crew proficiency is intended to prompt ideas and comments from tankers throughout the Army. Send your ideas and comments to the Training Development Test Directorate, HQ, TCATA, Fort Hood, Texas 76544.



LTC ERIC L. PRALL received his commission in the Corps of Engineers upon graduation from Purdue University in 1960. He has served in a variety of command and staff positions in Engineer troop units, as an advisor to the Royal Thai Army Cavalry Division and as an ROTC Instructor Colonel Prall is currently assigned to the Training Developments Test Directorate, Headquarters TRADOC Combat Arms Test Activity.

THE EMERGING LOGISTICS SYSTEM

When we have to fight again, we will most probably do so with the resources—people and equipment—available to the Army when the conflict begins. We cannot expect a long warning period that will permit industry to gear for production or permit significant mobilization and training of manpower.

This reality, along with the budgetary constraints that limit the fulfillment of our commitments, has led to the development of an austere concept for support of the Army in the field.

The concept focuses on support of the combat elements. Appropriately, the description of support begins at the edge of the combat battlefield where direct support to combat elements is provided. This is by far the most important place in the logistics system; all other elements support it.

At or near the battle area, we arm, fuel, and, when necessary, fix the combat weapon systems. Forward elements of the Division Support Command (DISCOM) provide ammunition, fuel, and maintenance assistance to the combat forces in each combat brigade. A forward area support coordinator (FASCO), who is a member of the DISCOM, is with each combat brigade of the division to ensure that organizational support elements are properly located and manned and that the needs of the combat brigade are efficiently provided.

In summary, the forward elements provide the supplies, maintenance, and transportation assistance where it is needed at or near the battle area.

The overall management of the division support is conducted by Division Support Command headquarters. Here, the division materiel readiness status and overall logistics situation are constantly monitored and managed. Here, also, transportation movement data are coordinated with supply requirements for integrated support management.

Logistics data are provided by the Division Support Command to the G4 staff for use in operation plans and command decisions. In turn, the G3 and G4 give support priorities to the Division Support Command and direct the buildup of materiel as required for planned operations. This is the normal command and staff relationship.

The Corps Support Command provides direct support to supporting corps units located behind the division boundaries in the same manner that the Division Support Command provides support to division units in the division area. However, the primary logistics task of the Corps Support Command is to provide general support

to the divisions and all corps elements. General supply support is provided from corps general support stocks of classes I, II, III, and V items with the throughput of supplies received in the corps being a normal mode of operation. Maintenance and materiel technical support would be provided by six general support technical centers, each structured on a systems basis. These are—

- Combat vehicle and armament center.
- Aviation center.
- Communication-electronics center.
- Missile and munitions center.
- Wheeled-vehicle center.
- Support equipment center.

Overall management of corps logistics operations is accomplished at the Corps Support Command with standard automatic data processing systems. Corps requirements are requisitioned directly from the continental United States wholesale supply sources. The Corps Support Command, then, becomes an *autonomous logistics entity supported from the continental United States base*.

In a continental theater of operations an area command may be established behind the corps rear boundary. Its job is to receive materiel as it comes through the ports and move it to the corps. It is a port operation, port clearance, move-through-to-the-customer kind of service.

The new concept eliminates communication zone and field Army support as we have known them in the past and relies on responsive support to corps from the continental United States. In this austere support structure, shipments must consist of only those items that were ordered. In a combat corps there will be no more than 30 days of supply on hand, with 2 to 3 days supply in the brigade, 3 to 5 days supply in the division, and the balance of 22 to 25 days supply in the corps rear area.

Although this concept greatly reduces the management echelons, modern management techniques will permit efficient and technically competent logistics support. The goal is to field the most effective total force in the combat theater—the optimum mix of combat and support organizational elements.

The system is characterized by factors that demand careful consideration in planning and support management.

- Complexity—the Army requirement for increased performance of equipment on the battlefield has been attained at the cost of increased sophistication and

complexity.

- **Airlift capability**—The requirement for repair parts is the one area that is not reasonably predictable in wartime. The system must respond from the continental United States to provide the critical items as rapidly as possible. That means airlift.

- **Containerization**—The heavy tonnage surface lifts will be containerized and the containers will move as far forward as possible before being emptied and recycled.

- **Automatic data processing**—Improvements in computer technology have provided a powerful tool for absorbing and analyzing great quantities of data.

- **Communications**—Modern communications systems, including satellites, provide the capability to transmit near real-time information around the world.

- **Maintenance and repair**—Renewed emphasis is being placed on doing as much maintenance and repair as far forward as possible.

The establishment of technical centers in corps general support would constitute a reversal of existing doctrine that spreads the technical competence in a corps horizontally. By focusing this talent in a single technical element by weapons system or by type of equipment, we can, like the Israelis, maximize our

capabilities to support combat systems.

Tomorrow's battles will be decided more and more on how effectively we use and support our limited quantities of combat equipment. The commander who knows that he must fight lean also knows that conservation and success in battle are mutually supporting concepts. Materiel saved as far forward as possible is available when and where it is needed. Key factors in such conservation are setting and adhering to priorities, realistic replacement and expenditure rates, full use of local resources, security for stocks and lines of communications, sound materiel management, and the willingness to take prudent risks.

We must be as efficient with support as humanly possible in order to provide maximum resources to the combat forces. We must develop the most effective total force in the combat theater. Uppermost in our minds as we develop the support arrangements for that force should be the thought that we will probably be outnumbered by our enemies and even one of our tanks out of combat will be critical.

Condensed from an article by Major General Erwin M. Graham, Jr., in The Army Logistician.

THE OBJECTIVE OF ARMY INTELLIGENCE

It is time for us to address ourselves to the objective that Army Intelligence has, or should have, in fulfilling its obligation to the Army and the Nation.

Our real focus of attention must be on tactical intelligence, on developing the capabilities and skills, on acquiring the techniques and equipment, on achieving the readiness necessary to give our Army success in combat.

A major factor in the ability to win is the knowledge of potential adversaries; advantage will accrue to the army that understands and trains to exploit the doctrinal and weapons system vulnerabilities of its enemy. Army intelligence is the key to this. It must produce the requisite information in usable form and must actively participate in training planning to see that the information is integrated properly into training and skill. In its use is correctly evaluated.

Intelligence must be given its proper place in the combined-arms team. The intelligence officer must seek to establish himself as an indispensable member of the team directing the battle, and to see to it that systems and units under his supervision act in full concert with all other units to win the battle. This means the intelligence officer must be as intimately familiar with our tactics and techniques as his combat arms brothers, must speak their tactical language, must be tactically and technically proficient in employing his own resources and, above all, must be innovative and aggressive. This last may mean a certain amount of "lapel shaking" to get his point across, but it must be done. The intelligence officer who waits to be sum-

moned, who waits for a request for information, just isn't doing his job.

When combined and joint exercises are planned, the intelligence officer will play a key role. He will be the source of information about our allies, their organization and capabilities, their strengths and weaknesses; and he will be the nodal point between intelligence services, to see to it that all possible relevant information is obtained.

When battle is joined, the intelligence officer can contribute to the conviction of victory by making our soldiers and their leaders aware of their counterparts on the opposing side. The soldiers need to have a general idea of the capabilities and identity of the people they are fighting; this "personalization" of the enemy reduces him to his human dimension and strips him of propaganda—generated myths of invincibility which feed on, and are magnified by, lack of information. The battle captains need to have as detailed an insight into the capacities of specific opposing leaders as can be gotten. They must know if he is a gambler or cautious; if he prefers flank to frontal attacks; if he reconnoiters thoroughly or accepts battles with minimal preparation, etc. Put yourself in a commander's shoes; what would you want to know?

A technique for getting to "know the enemy" is known as the Opposing Forces Concept, or OPFOR. Recently approved for implementation, it holds that understanding of the enemy is deepened by knowing the manner in which that tactical doctrine is applied to variable geographic and climatic situations, and is perfected by

the recurring opportunity to "fight" the opposing force in peacetime, under simulated battle conditions which are as realistic and safe as the imagination of the U.S. soldier can create. Included in this peacetime training is the need to fine-tune the skills and perceptiveness of U.S. tactical intelligence enabling the commander to see the battlefield in war. This concept can represent an order-of-magnitude improvement on the Aggressor Doctrine we have been using for the last 30 years.

Finally, intelligence is for commanders, who must succeed on a battlefield of greater challenge than ever before experienced by the U.S. Army. To succeed, commanders must orchestrate their intelligence resources to insure they spark the combined-arms team in the execution of the tactical concept. Commanders must begin their intelligence preparation of the battlefield in peacetime by understanding their potential adversaries, and applying this knowledge to the specific terrain of the first battle. The preparation is the foundation upon which seeing the battlefield with certainty is based.

To insure the success accrued by battlefield certainty, commanders must strive to concurrently make the enemy uncertain and vulnerable to deception and surprise. Operational security (OPSEC), derived from tactical counterintelligence, also facilitates the prudent use of economy of force to achieve favorable forces ratios at the decisive point. No commander will be stronger at the decisive point on the modern battlefield unless he demands the intelligence he needs on enemy intentions and capabilities, and understands the tactical doctrine of the opposing force. The commander will rarely be given all the intelligence he requires. He must go after it personally. Command certainty of the battlefield will be the difference between being a winner or a loser. Certainty will be a characteristic of the commander who wants to win.

Condensed from an article by Major General Harold Aaron, Assistant Chief of Staff, Intelligence, Department of the Army, in MI Magazine.

TARGET ACQUISITION

Numerous efforts are being made to improve our target acquisition capabilities. Division artillery and corps artillery commanders are experimenting with reorganizing their present equipment, personnel and communications to obtain maximum effectiveness and responsiveness from their resources and to open new and better links with maneuver and intelligence forces.

Target acquisition is being exercised against our own artillery and maneuver elements to reveal their vulnerabilities and to sharpen the skills and responses of the targeting systems against real targets. These exercises, together with the studies of our schools and research agencies, the development of training circulars with new doctrine, and new target acquisition organizations are representative of the ongoing efforts. Major advances are being made in application of modern technology and the development of new equipment for the artillery and the military intelligence community. This includes laser range finders and designators, mortar and artillery locating radars, moving target locating radars, drone aircraft and remotely piloted vehicles (RPVs), remote sensors, electronic location systems, and aerial imagery—using TV, infrared, radar, and photography.

Too often the improvements of a military capability first take the form of developing and purchasing new equipment—then the doctrine, organizations, and missions evolve to fit the equipment. Today's effort to improve target acquisition includes a new look at the doctrine procedures, organizations, and equipment. In essence, a "whole cloth" new target acquisition system for Field Artillery (FA) is evolving. Uppermost among other considerations for development of this system is the threat, based on Soviet equipment and doctrine.

A new target acquisition system must locate targets

accurately and be immediately responsive to the maneuver commander's desires for suppression and destruction of targets at all levels. Suppression of many indirect and direct fire weapons can be accomplished quickly by the artillery only if the element that locates the target makes the data available immediately to the fire direction center (FDC) and if prior target data are properly analyzed and in useable form. Responsiveness must be the key to any new target acquisition system and to have responsiveness there must be a target acquisition system at all levels of FA—direct support (DS) battalion, division artillery and corps artillery. The key word is "system." The system includes a large number of information-gathering sources.

There are many new items of equipment currently under development, as mentioned, and this materiel will provide some of the targeting data. Observers are also a part of the FA target acquisition system and their observations, or lack thereof, must be thoroughly coordinated with all other sensors on the battlefield. ASA assets; including the military intelligence battalion, air reconnaissance support (MIBARS); aerial surveillance company; maneuver forces assets; Air Force assets; and aerial observers, must also be considered sources. To properly coordinate and disseminate the data from these sources, there definitely must be a counterfire control center at each level. At the DS battalion, targets of concern to the control center would be primarily mortars, personnel, direct-fire weapons/antitank guided missiles (ATGM), vehicles, and command posts. The scale of the activities of the DS battalion will take priority. At division artillery, targets of interest would be largely artillery, heavy mortars, vehicles, personnel, command posts, resupply points, choke points, and air defense sites. At corps artillery, targets of primary in-

terest would be supporting artillery and missiles, command posts and supply dumps, and deep air-defense sites.

The DS battalion would have a target acquisition capability including a lightweight, portable moving-target locating radar; a lightweight, mobile mortar-locating radar; and forward observers equipped with laser range finder/designator and thermal imagery devices.

The division artillery would have a target acquisition battery to employ artillery locating radars, moving-target locating radars, sound and flash ranging, aerial observers, and a drone or RVP. A "heavy" target acquisition battery would be found at corps artillery to provide deep target acquisition and a limited supplement to a division with long-range drone or RPV, sensors, and radar systems.

The control and management of these resources at each level would be through the counterfire control center. A computer would be available in each counterfire control center with sufficient storage and analysis capacity to receive and analyze all the data from the resources suggested plus all other sources of intelligence. A computer to process these data would be absolutely essential for proper management of the target acquisition system. The maneuver commander would then have more options as to how, when and if his artillery would be used to attack these targets.

Counterfire control centers would be located adjacent to the corps fire support element (FSE) and division artillery tactical fire direction center (FDC), and there would also be smaller counterfire control centers at the DS battalion FDC. These centers will manage all of the available target acquisition assets in their zone of action in addition to coordinating and analyzing target data. Communication networks between the counterfire control center, target acquisition devices and the fire support officers (FSOs) and FSEs would be established. Computers would be utilized to analyze data received at corps and division level, and the DS bat-

talion would have an input-output terminal into this target analysis system. Control of all target acquisition devices at the division level and the integration of all sources of intelligence would be performed by the counterfire control center.

To summarize, the new target acquisition system would have the following characteristics:

- Corps artillery would have the responsibility for acquiring and suppressing long-range artillery, missiles and deep air-defense sites and assisting division artillery in their counterfire role.
- Division artillery would have the counterfire mission and be responsible for acquiring targets such as artillery, mortars, vehicles and personnel
- The DS battalion would have a counterfire capability which would be primarily directed against mortars.
- One or more heavy target acquisition batteries would be organic to corps artillery.
- A target acquisition battery would be organic to each division.

What has been proposed as a system for target acquisition tomorrow is certainly subject to careful scrutiny. A new target acquisition system is currently evolving at Fort Sill and your participation is welcome and invited. In these days of personnel shortages and money constraints, any new system is automatically disadvantaged. The new target acquisition system will require people, new doctrine, money, a thorough and complete education of the entire Army and continuous command emphasis at all levels.

The price is high; however, if it is not paid, the price of a future conflict on the modern, mobile battlefield will be even higher. A good kill capability is simply not enough. The army which has the best means to "see" as well as "kill" its targets will win.

Condensed from an article by Colonel Donald M. Rhea in the Field Artillery Journal.

REFORM AND RESTORE

Reformers must reform only that which must be reformed; reorganizers must reorganize only that which must be reorganized. A combination of puritanical zeal, cynical political partisanship, and bureaucratic power plays can complete the already well-advanced destruction of America's eyes and ears—its intelligence service.

If restoration of U.S. intelligence effectiveness is indeed what motivates the reformers, they must face up to the hard problem of protecting U.S. state secrets, rather than the easy one of creating new Congressional Committees. Legislation is required which recognizes the right of the United States government to have a secret and which provides practical means to apply criminal sanctions to those persons entrusted with secrets who abuse their trusts. This means that the public media must not remain immune from responsibility for publica-

tion of national secrets and from protecting the insider who has provided the information and violated his trust.

Within the Executive Branch, the emphasis in providing better intelligence organization and oversight of intelligence activities should be based on the realities of the changed world situation, the new technology of intelligence, and the long-standing problems of community coordination—not on the sensational stories arising from Congressional inquiries.

If we are careful, the viability of U.S. intelligence can be retained and much of the damage done repaired; if we are not careful, we can so weaken U.S. intelligence that our country will resemble a blind giant groping its way through the dangers of the next decade.

*LTG Daniel O. Graham, USA (Ret)
USSI Report 76-1 ▲*

BEEHIVE



An Innovative Approach to Employment

by Major Eugene D. Colgan

From a military viewpoint, the October 1973 Mideast War provided major insights into the effectiveness of new Soviet equipment and allowed the U.S. to evaluate Soviet Military technology under combat conditions. I intend to focus on one small aspect of that war—the development of tactics to defeat the Soviet family of antitank guided missiles (ATGM). Of the many lessons learned from this conflict, I feel the most important to the Armor community deals with the effectiveness of the Soviet antitank guided missile and the means we have available to counter this threat. If Armor is to continue to be an effective ground gaining arm, we must learn to reduce our losses due to modern antitank weapons. Former Secretary of Defense James Schlesinger expressed this belief in his *Defense Report*, FY 1975 when he stated:

"The recent Middle-East War has demonstrated that our tanks must not only be able to defeat the opposing tanks, they must also be able to survive against the opposing tanks and antitank weapons."

Much has been written about the effectiveness of the Soviet antitank guided missiles and the heavy losses the *AT-1 SNAPPER* and *AT-3 SAGGER* inflicted on the Israeli tank corps. Early reports credited ATGM's with a large percentage of the 550 Israeli tanks lost during the first 7 days of fighting. However, a recent publication claims that ATGM's received more publicity than their record deserved. Studies of damaged Israeli tanks indicate that only 25 percent of the destroyed tanks were hit by missiles. If this is correct, then ATGM's accounted for 137 plus Israeli tanks, and although not as formidable as first believed, they were still an important killer on the modern battlefield and a force to be reckoned with.

The current family of Soviet antitank guided missiles can be divided into two broad categories; the wire-guided types represented by the *SNAPPER* and *SAGGER* missiles and the newer radio-guided *SWATTER* missile. The *SNAPPER* is obsolete and will not be addressed at this time.

Table 1 lists the characteristics of both the *SWATTER* and *SAGGER* ATGM's. The missiles are small, light-weight weapons with a 3,000-meter maximum effective ranges. The *SWATTER* is currently a vehicle-mounted weapon found on BRDM reconnaissance vehicles and the *HIND* assault helicopter. The *SAGGER* can be vehicle-mounted or man-packed and ground launched. Additionally, the *SAGGER* allows the gunner to fire and guide the missile from a remote location up to 80 meters from the vehicle launcher and 15 meters from the ground mounted launcher. The *SAGGER* presents a difficult launch signature to identify, but the relatively slow velocity of the ATGM makes it easy to observe in flight and an alert tank crew should have no difficulty detecting an incoming ATGM. The *SAGGER/SWATTER* warhead is a high explosive antitank (*HEAT*) type of charge that will defeat any known

Free World armor. In conjunction with this very lethal warhead, the Soviet ATGM's have a guidance system that produces approximately a 61 percent first-round-hit probability at ranges from 1,000 to 3,000 meters against a stationary, fully-exposed *M-60A1* tank type of target. (See table 2.)

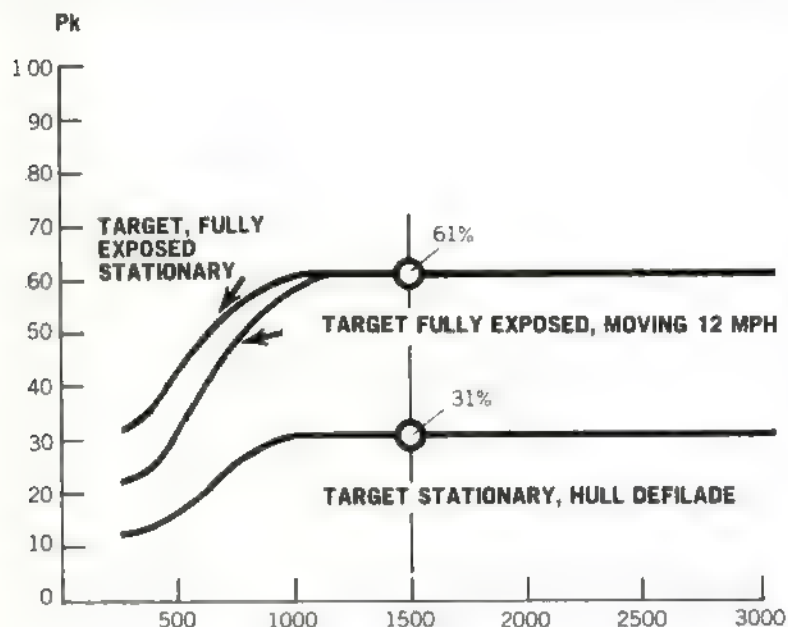
Soviet ATGM's are not infallible, the missiles contain design limitations which can be turned into vulnerabilities by an astute adversary. The *SWATTER* is susceptible to electronic countermeasures and both *SWATTER* and *SAGGER* require good visual contact with both target and missile during flight. The missiles are slow, and erratic target movement makes tracking and missile control very difficult. The gunner is required to track the target and the missile simultaneously and this requires a high degree of training and skill on the part of the gunner. Additionally, each missile has a 500-meter minimum effective range. This is caused by the requirement to capture the missile after launch before corrections can be made to fly the missile to the target. By attacking the design limitations of the missiles, we should be able to limit their effectiveness and reduce our losses on the modern battlefield.

Table 1. Characteristics of Soviet ATGM's.

1973 OCTOBER WAR

Characteristic	SWATTER	SAGGER
Length (in)	45.8	34
Diameter (in)	5.2	4.7
Weight (lbs)	85	24.9
Ranges (meters)	at least	
Max eff range	3000	3000
Min eff range	around 500	500
Time of Flight (sec) to Max Range	23.2	27
Armor Penetration (in @ 0 Deg)	20	16
Guidance System	Radio	Wire
Average Velocity (m/sec)	150	120
Warhead	HEAT	HEAT

Table 2. Probability of first round kill by a SAGGER fired at an M-60A1 tank.



Countermeasures are designed to defeat the missile gunner because he is the weakest link in this system. The gunner must be able to track the target and the missile simultaneously and any actions taken to distract or suppress the gunner will reduce his ability to place accurate fire on the target. By defeating the gunner, we are able to defeat the antitank guided missile.

The best method for suppressing ATGM's is through the use of combined-arms teams. Armor, Infantry and Artillery working closely together in a mutually-supporting, close-knit team can place accurate, responsive fires on ATGM locations or suspected positions. The infantry must move with the tank and provide close-in protection because ATGM positions are normally protected by enemy infantry tank-killer teams armed with RPG 7 rockets. In addition to suppressing the ATGM's, we must also defeat the dismounted tank-killer teams forward of the ATGM positions. The infantry must destroy the RPG 7 teams while the tanks and artillery are concentrating on the longer range ATGM's.

Artillery fires must be planned to support the tankers' movement and must be responsive if suppression is going to work. In addition, the tanks must plan to make maximum use of the terrain and present as small a target

as possible to the enemy. Movement should be by bounds with overwatching tanks ready to provide direct suppression fires in the event the moving vehicles are fired upon. Every effort must be made to reduce the time a tank is fully exposed in open terrain. Smoke should be used to obscure suspected ATGM positions and movements must be timed to take maximum advantage of the obscuration. Techniques like the white phosphorous overwatch described in the March-April 1975 issue of *ARMOR* can be used to create smoke screens between the ATGM gunner and his target. Darkness and periods of reduced visibility such as fog or rain can also provide limited protection from detection and reduce the long range advantage of ATGM's.

The *SAGGER watch* and *dodge* are techniques that were developed during the 1973 Middle-East War to reduce the effectiveness of ATGM's. The *watch* consists of designating one tank or a section in a platoon to watch for ATGM's being fired at the platoon. If a missile is detected, the watching vehicle alerts the platoon by radio and also attempts to determine the missile's target. The watching tank immediately places suppressive fires on the launch location in an attempt to distract or destroy the gunner. The platoon takes evasive action and moves to any

natural cover available. I believe the most effective use of this technique would be in a movement by bounds with tanks in overwatching positions as a *SAGGER watch*. This would allow a high volume of suppressive fire to be placed on the launch location by a number of tanks, and it would also counter the practice of firing the *SAGGERS* in volleys from multiple launch locations at single targets. The overwatch tanks could rapidly return fire on a number of launch locations, thereby providing the needed suppression and reducing the probability of a target kill.

The *dodge* technique is used once the ATGM's target is identified. The target tank moves immediately to a turret defilade position. If this is not possible, the tank would seek whatever cover was available to present the smallest target possible. The worst case situation is being caught in the open with no chance of reaching cover before the missile impacts. In this case, the tank would move following an erratic path to try to cause the gunner to overcorrect his missile and lose control. A variation of the *dodge* is to wait until the missile closes to within 300-400 meters of the tank, then make a hard left or right turn. The gunner will have to correct for this violent turn and it is difficult for the *SAGGER* to react that quickly at the reduced range.

105-mm BEEHIVE (APERS-T)

The introduction of a *BEEHIVE* (APERS-T) round with a mechanical time fuze for the M-68, 105-mm tank gun adds a new dimension to the established methods of suppressing ATGM's. Now we have the ability to attack ATGM gunners with an area-fire round that gives us both width and depth through the target area. The fuze can be set from muzzle action to 4,400 meters. The fuze has index marks every 100 meters and numbers every 200 meters.

The 105-mm *BEEHIVE* projectile contains 5,000, 13-grain steel flechettes and produces a pattern that is 300-meters deep and 119-meters across at its widest point. When fired at a range other than muzzle action, the fuze functions approximately 75 meters short of the indexed range. This allows the flechettes to disperse short of the target and insures good coverage through the target area. When the fuze

functions, a yellow smoke marker is emitted which allows the tank commander to adjust the range element as required.

This round gives the tank a responsive means of suppressing ATGM's. We know that, as the battle develops, there is always the chance that we will not have preplanned artillery fire on every possible ATGM location. The *BEEHIVE* round provides a direct fire means of suppressing these unplanned for launch sites with a large degree of area coverage and allows immediate, effective fire to be placed on the ATGM location while artillery fire is shifted or requested.

Methods of Suppressing ATGM's With Beehive

Employment of *BEEHIVE* in ATGM suppression is not presented as the ultimate technique, but rather as an added method to be integrated with the established countermeasures discussed earlier. When using the *SAGGER Watch*, in a movement situation, one watch tank could carry *BEEHIVE* in the tube with 2,400 or some other range element determined by experience and terrain conditions indexed in the range finder and on the round. Once an ATGM launch is detected, the watch tank returns fire from his battlesight and applies burst on target from the yellow smoke marker to correct for range errors. The same procedure can be used when a platoon is in an overwatch position. By mixing the chambered rounds between *BEEHIVE* and antitank rounds, and varying the indexed battle sights, the overwatch tanks can quickly return fire on any threat. The mix of rounds and the indexed ranges would be determined by the threat and local terrain conditions, and would be a matter of unit SOP when in overwatch positions.

BEEHIVE can also be used with the *dodge* technique. The target tank would immediately clear its tube by firing its chambered battlesight round at the launch sight. The tank commander would announce *BEEHIVE dodge* to alert the crew of the expected battle drill. The loader would pick up and chamber a *BEEHIVE* round set for muzzle action carried in the ready rack for this technique. The gunner would lay the gun in the direction of the incoming missile and attempt to hold the

tube level with the ground. The tank commander would remove all range from the system and place himself where he can observe the approaching missile. As in the *dodge* technique, the missile would be allowed to close to within 300-400 meter, at which time the tank commander would announce, *READY, HARD, LEFT (RIGHT)*. The crew would be alerted with the command *READY* and on hearing *HARD* the gunner would fire the muzzle action round toward the missile. The gunner would not pause one second before firing, but would immediately fire the round, so the crew must stand clear of the breech once this drill is started. The driver would key on the main gun and execute a violent turn when the gun fires.

The rationale behind this technique to give the tank a better chance of defeating the missile. The missile must fly the last 300-400 meters through the 5,000 13 grain steel flechette pattern which could damage or destroy the missile. However, a more likely outcome would be a large amount of obscuration directly in front of the tank as a result of muzzle blast and flechettes impacting with the ground. This obscuration in conjunction with the tank's violent turn, compounds the ATGM gunners control problem and increases the likelihood of a successful *dodge*.

The immediate responsiveness and area coverage of the *BEEHIVE* round makes it an ideal ATGM suppression weapon. Additionally, the large depth and width of the pattern counters the Soviet advantage of remote operation in displacing the gunner from 15 to 80 meters from the launch site. Granted, the *BEEHIVE* round has very limited application against armored vehicle mounted ATGM's, but it will suppress the suitcase *SAGGER* and defeat the gunner of a vehicle mounted ATGM if he elects to fire from a displaced location. Incorporating *BEEHIVE* with the *SAGGER dodge* gives the tank crew an offensive action it can take when it realizes it is the target of an ATGM. This action should also increase the effectiveness of the *dodge* technique.

A major problem facing Armor now is to determine the proper mix of *BEEHIVE* compared to other rounds carried in our tanks. The October War confirmed Armor's role as the principle tank killer on the modern bat-

tlefield. It is apparent that antitank ammunition must comprise the majority of rounds in the tank's basic load. The trade off must be made between *SMOKE* and *BEEHIVE*, because *SABOT*, *HEAT*, and *HEP* all have antitank applications. The problem is further complicated by the limited storage space available in our tanks. However, I feel the final decision should be based on one important fact. *BEEHIVE* can kill the ATGM gunner, while smoke is primarily used to create obscuration between the ATGM gunner and his target. I feel the artillery should be used for smoke missions and tanks should carry *BEEHIVE* in place of smoke in the basic load.

The tank's ability to survive in future mid-intensity conflicts will depend, to a great extent, on how well we have learned our lessons from the 1973 Middle-East War and our ability to continue to improve the tactics and techniques needed to defeat modern antitank weapons.



MAJ EUGENE D. COLGAN was commissioned in Armor upon graduation from West Texas State University in 1965. He has served as a tank platoon leader, battalion S-3 Air, battalion S-3, tank company commander and G-3 staff officer in Vietnam he served as a rifle company commander. A former instructor and chief of the Range Branch, Gunnery Division, Weapons Department, USAARMS, Major Colgan recently graduated from the Command and Staff College and is currently executive officer, 4th Bn, 68th Armor, 82d ABN Division, Fort Bragg

Revive the Telescope

by Captain Everette L. Roper, Jr.

During the past few years, the Armor community has taken gigantic strides in tank gunnery training. The October War shockingly opened our eyes to the fact that some of our tactics and techniques were outdated. We now accept that we must be prepared to fight outnumbered against equipment that is comparable to our own, and we agree that in order to win the first battle of the next war, our tank crews must be the best trained in the world.

Even though we have vastly improved our tank gunnery training program, we have virtually overlooked an important area—the secondary direct-fire system. To date, the new battlesight gunnery techniques, rapid engagement times, and fire adjustment procedures focus on the primary system. Little of our training literature addresses techniques of gunnery with the telescope. This is a shortcoming which warrants immediate attention.

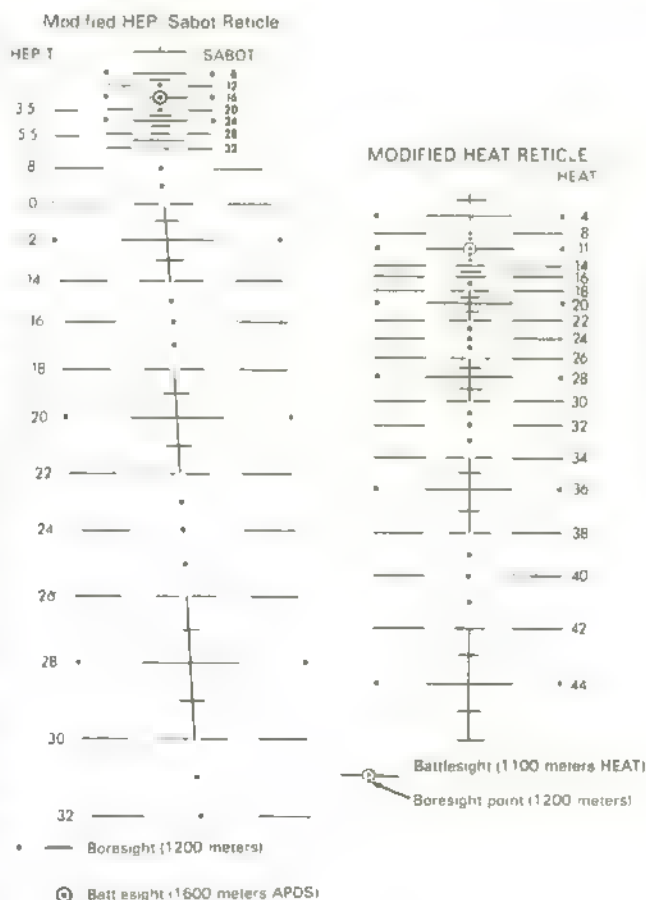
Use of the Telescope May be a Necessity

It is generally conceded that the next war will be a "come as you are" affair, and that the first battle may very well be decisive. If so, there may not be time for the traditional turret preparation and synchronization habitually associated with a tank battalion's annual tank gunnery. While the primary direct-fire system is a highly accurate system, it is complex, delicate, and not easy to troubleshoot. This, coupled with the level of expertise of today's tank crews and maintenance personnel, often causes serious problem for tank battalions. In many cases success in annual gunnery qualification is largely dependent on the unit's ability to detect and correct such things as loose mirrors in periscopes, worn bushings in linkages, slightly loose head assemblies, computers with worn cams, etc. A profile of the relative maintenance problems of a tank battalion in the 1st Brigade, 1st Cavalry Division during a recent 90 day gunnery period tends to support this view. During that time, approximately 25 percent of the battalion's primary fire-control equipment was in an inoperative status at some time. In short, the biggest problem in tank gunnery is often in preparing the tank, not the gunner, to fire. Since there may not be time for this preparation, we may be forced to enter combat using the secondary direct-fire system.

The telescope, however, has some drawbacks in its present configuration. Our gunners hesitate to use the telescope under the stringent new engagement times because of the difficulty in interpolating a range on a line or in an open space and problem of selecting a precise aiming point on a 200-meter range line or space respectively.

You can make a quick comparison of the reticles by using

figure 1. Do this by using two people, one acting as gunner and one as tank commander. The TC should announce several fire commands with different range elements. Using the drawing of the old reticles in FM 17-12, the gunner uses a pencil or like object to point out his selected aiming point for each range. He should do this as quickly as possible. Note the time required and check the selection of aiming point closely for accuracy, as the gunner is required to interpolate for most ranges. Now repeat the process using the drawings of the new reticles. The gunner should look first at the column of numbers under the appropriate type of ammunition. When range is announced, he simply looks down the number scale to within 100 meters of the correct range, follows the lead line to the center of the reticle and selects his aiming point. (Pay particular attention to odd ranges of + 50 meters). This should give you an idea of the ease in using the new reticle.



Training in the 1st Brigade has been standardized by having the tank commander announce range to the nearest 100 meters and having the gunner use the same procedure as described above. If you prefer the old FM 17-12 technique of announcing range to the nearest 50 meters, the advantage of using the new reticle becomes even more apparent.

Test Results

Recently the 1st Brigade, in conjunction with the TRADOC Combat Arms Test Agency (TCATA—formerly Modern Army Selected Systems Tests, Evaluation and Review (MASSTER)) conducted a test comparing the new reticle with the old. The test was an exercise to determine comparative times and accuracy of lay. The test demonstrated.

- A 25 percent improvement in accuracy of lay with the new reticle. (The probability of laying the correct range index on target with the current reticle was .71 percent; the probability of the 1st Brigade modified reticle was .89 percent. This is an .18 percent probability increase, or a 25 percent improvement over the current reticle).

- An improvement of 1.75 seconds in computed average times of lay for "battlesight" (SABOT reticle).

- A subjective preference for the new reticle by 9 out of 10 gunners tested.

These changes are not revolutionary, but they do point out that considerable improvement can be made on the existing system. These modifications, however, barely scratch the surface of improvements possible with the telescope.

Consider these possibilities for future development:

- The telescope could be designed with variable power magnification. Target acquisition and hand-off between TC and gunner could certainly be enhanced by having a two- or three-power telescope with a wide field of vision. The capability already exists to switch from that to a 13- to 15-power lens for extreme accuracy. A similar system exists today in the *Cobra-TOW (AH-1Q)*.

- Experiments in the 1st Brigade have shown that the average time required for the tank commander to look up from his eyepiece, read the range finder scale, and announce range is approximately 2½ to 3 seconds. If the range scale were visible in the eyepiece, at least 2 seconds could be saved by not requiring the TC to turn his head, focus on a poorly lit, hard-to-read scale, announce the range, and return his head to the eyepiece. When laser range finders are introduced, a digital display of the range in the eyepiece or telescope could save perhaps 5 to 8 valuable seconds in getting off a well-aimed shot.

- The telescope eyepiece, through articulation could be moved to a better position for the gunner's use. The use of a fibre optic connector would allow the TC to view the same sight picture as the gunner, thus permitting the capability of firing the *M-105D* from the TC position, and would also eliminate the need for synchronization between the TC sight and the telescope. Given these improvements—and all are within the realm of "off the shelf" production—we can then have a secondary direct-fire system which certainly approaches the accuracy of the primary system, while maintaining a far greater reliability.

Simply stated, we have ignored the telescope long enough. Common sense tells us that we may have to rely on it. Yet,

we continue to produce a secondary direct-fire system which obviously requires improvement in materiel and lacks a standardized doctrine on techniques of fire. These telescopes and reticles are being produced today for our *M-48A5* tanks. The potential for telescope development is vast and should not be ignored. The technology and expertise to make improvements is available now.

Further Developments

In an August 1975 briefing, Colonel Woodmansee (Commander, 1st Bde, 1st Cav Div) expressed his concern for problems with the present *M-105D* telescope combination reticle to the Weapons Department, USAARMS. Since that time, the following actions have taken place:

The U.S. Army Armor School, on 27 April 1976, conducted a conference with other users and combat training and material development representatives to establish status and requirements for the *M-105D* telescope reticle and associated computer cams. During this conference, the problems pertaining to the present reticle were discussed in detail. Several reticle proposals were presented and considered. A subsequent meeting was scheduled to select the best reticles from among those proposed.

The Weapons Department hosted an in-process review (IPR) on 16 June 1976, during which several proposed reticles were considered for testing. The Fort Hood reticle, a Fort Knox reticle, and a hybrid reticle were selected and forwarded to Frankford Arsenal to be mounted in a Wiley conduct-of-fire-trainer (COFT) reticle wheel.

When the reticle wheel was returned to Fort Knox, the Army Armor & Engineer Board (AARENBD), in conjunction with the Weapons Department, tested the reticles, utilizing the Wiley COFT and Fort Knox gunners. The test was completed 31 August 1976 and the reticle was sent to Frankford Arsenal for prototype modeling.



CPT EVERETTE L. ROPER, JR. was commissioned in Armor upon graduation from Northeast Louisiana University in 1969. Having served with the 11th ACR in Vietnam and Cambodia, he commanded an aero-rifle platoon and served as assistant S-3. A former company commander of the 2d Bn, 8th Cav and assistant S-3, 1st Bde, 1st Cav Division, Captain Roper is currently a personnel management officer at OPMD-MILPERCEN.

Some Projects Never Die — But Should

The other day, I had occasion to read a trade journal and came across an article on an item of equipment recently fielded into the Army inventory. The article was written by an individual from the Project Manager's Office and contained many laudatory comments about the vehicle. This started a chain of thoughts, and since I was somewhat familiar with the vehicle, I realized that this article was every bit as much of an advertisement for the equipment as if it had been prepared by one of the leading Madison Avenue advertising agencies.

The question arises, what's wrong with an individual from the Project Manager's Office being a partisan advocate for his equipment? The answer, I believe, is *everything!* For years, Project Managers have been graded by the success of their project. This forces the Project Manager to be a super-salesman in order to keep his project alive through the many reviews, both within the Department of Defense and at the ultimate purchaser, Congress. I know of no instances, although admittedly my experience in the field is limited, wherein a Project Manager would state "let's kill this project, it's not worth the effort," but I do know of innumerable cases where Project Managers and their people have come up with one "fix" after another to repair the vehicle or make it more suitable. A classic example of this is the *GOER*. It is inconceivable, to me, that this vehicle will be successful in

the field. It is uncomfortable, oversized, and unreliable. It has been this way since its inception in the early sixties. I have known no one who has had any experience with the vehicle, who has shown satisfaction with it. Yet this project has stayed alive over many years and its product is now being issued to the field, where it will spend many long hours in Support Maintenance. I wonder if vehicles like the *GOER*—and this vehicle is not unique in the field of "dogs"—which are eventually issued to the Army and become standard items of equipment because Project Managers would not let their project die.

Equipment continues to cost more and more, and development costs are skyrocketing. Yet for some reason, we continue to develop larger, more expensive, more sophisticated, less reliable equipment. I think the time has come for the materiel developers and the Project Managers to take a hard look at their projects and eliminate the costly and the unnecessary. I would only hope that the conscientious Project Manager who does this would be given credit by his boss for the money he saves the taxpayers instead of being graded down for killing a project.

—LIEUTENANT COLONEL CYRIL W. APPEL
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Miniature Terrain

The United States Army's return to fundamentals has meant more than concentration on the basics. It has also seen the dragging out and dusting off of some ageless concepts. One of these is the employment of "miniature terrain," or more mundanely, the sandbox and terrain model.

The sandbox or sandtable, for one, has not been ignored by the more perceptive members of the Combat Arms Training Board (CATB), and the authors of our new and revised manuals. The new FM 21-6, for instance, devotes three illustrated pages to the subject, and the CATB has written and issued TC 21-6-2 entitled *Techniques for Using and Making Sandtables*. It would appear, therefore, that much has been told, but just because it is "writ large," does not ensure that the whole story is fully understood and the concept visualized and used.

Frequent exposure tends to kindle the spark, however, and this in turn encourages expanded use. With so simple and effective tools as sandtables and terrain models or boards, it would appear that every combat unit would be making extensive use of them.

The West German Army has long had elaborate sandtables in their barracks or *kasernes*. They can trace the for-

malized utilization of sandtables at least back to 1909 when a Bavarian school teacher named Martin Greubel demonstrated the "sandbox" technique to Field Marshal Graf von Haeseler. He immediately recognized the sandtable's potential for training, and soon the German War Ministry and the various military institutions adopted the technique.

On the other hand, CATB's TC 21-6-2 tells how Emiliano Zapata scratched out the course of his campaigns on the floor of his hut with a machete. Pressed for time, possessing no elaborate training aids, and scarcely able to read or write, Zapata used a simple expedient to brief his leaders.

Somewhere between the scratching in the soil and the formalized German employment of the concept is what the U.S. Army should strive for. In places where actually getting out into the field is difficult, units can benefit a great deal from accurate reproduction of terrain and representations of natural and man-made features. National Guard and U.S. Army Reserve units, especially, with their limited time and area, should all have sandtables or substitutes. Active Army units in places like Korea and Germany can also exploit the use of sandtables, even though they have easier access to good training areas.

When one thinks of miniature terrain, one generally sees it in two roles; teaching tactics and giving briefings. They are tremendous assets in these roles as the CATB pamphlet demonstrates. But there are other uses as well that make them valuable tools.

Uses during basic training are many. Many new soldiers have no appreciation for the use of terrain. They have never had the opportunity, or perhaps the desire, to get out and sneak through the woods and fields, using the folds of the ground and foliage to conceal their movement. They do not know how to use terrain to their advantage and thereby achieve their objective without getting killed or maimed. The sandtable is an excellent introductory tool to help overcome this deficiency.



The instructor strives to explain several things by taking a small segment of terrain which represents different ground forms and cover. He explains that the sandtable permits a perspective that includes both an aerial and horizontal view. He then discusses the terrain and ground cover forms by comparing them with each other, pointing out particular characteristics, and then explaining their significance to the soldier. The next step is to let the soldier discuss what he has learned and then test his knowledge.

Map reading is another subject for which the sandtable is a great asset. The instructor can represent towns and other built-up areas by reproducing symbols of man-made objects found on maps on pieces of cardboard or paper. Trees and bushes can be represented by cotton and sticks. Rivers can be shown in blue chalk. These are placed on the sandtable so that one can visualize what one could expect to see on a map or from the air. It is also easier to understand how distances and direction are represented on maps by using a sandtable as an introductory step to ground measurement.

With additional imagination, the sandtable can become a very valuable tool for such projects as preparation for firing tank crew qualification courses. It would be easy enough to lay out such courses on a sandtable, but to use the table in conjunction with the instructional TV now available to combat units, is to really exploit your training aid resources. A National Guard tank company, for instance, can go a long way toward preparing for its qualification firing at summer camp without leaving the armory.

A scenario for such training might well look like this. The course is laid out to scale on the sandtable. Trails with the correct curves and gradients would be sculptured in the

sand. Targets are placed at the correct places on the table. Then control points and safety markers are sited. A representation that is as close as possible to the real layout may be sought, or the course may be varied so as not to compromise the actual course. After laying out the terrain, each tank crew talks itself through the course.

Scout crews as well as tank crews can use this technique. For added realism, accurate scale models of the unit's armored fighting vehicles can be employed. Available in many scales, these models can be purchased in almost any hobby store.

But this is not the end. Where the actual course is represented, a camera is sent through it on one of the vehicles attempting to qualify. The cameraman makes a visual account of how to tackle the various stations. Then using the sandtable and film together, the crews get an opportunity to see and "feel" the course. Such a technique is especially effective if the crews have never had the opportunity to fire the range before.

This scheme was used in Korea several years ago with great success. Instead of instructional television, however, a simple 8-mm movie film was employed. The crews, some of which had Koreans in them, scored an almost perfect qualification record, and they had not been on the range before.

Perhaps the ultimate use of the sandtable or miniature terrain is the war game. With only limited space, however, the size of the units represented is naturally quite small. The U.S. Army Armor School has a set-up with crews actually moving, shooting, and communicating in simulated combat. This, of course, is not within the capabilities of most units, but a variation is possible.

A simple set of rules is established and accurate models of the unit's vehicles and personnel are obtained. Even if some realism is lost, the rules must be relatively simple. This permits concentration on the tactical problem and prevents getting involved in technicalities. Characteristics of the vehicles and their weapons are taken into consideration, and hit and damage tables are used.

Once the ground rules are laid down, the key personnel maneuver their troops and vehicles. This can be done by giving verbal and written orders to subordinates who move the elements on the table, or platoon leaders can maneuver all their units in an attempt to gain an advantage over, and thereby, beat the opponent. Such games can be fun as well as instructive, especially where special situations and special odds are incorporated into the match.

One can readily see the tremendous potential the sandtable or terrain board has. To build terrain models is a relatively simple matter and is well documented both in TC 21-6-2 and FM 21-6. To employ them requires only imagination and a little preparation to extract the maximum benefit.

Miniature terrain, then, is a tool that the commander can not afford to ignore. History has proven the use of terrain models' value, and it stands ready to record future successes which emanate from the effective utilization of something that is literally always under foot.

LIEUTENANT COLONEL RAYMOND E. BELL, JR.

(For more detailed information concerning the construction and use of terrain boards, see the October issue of Military Review. Ed.)

Since 1973 efforts have been underway to revitalize interest in the Armor Leadership Award within the Armor Community. The following article traces the Award's history from its inception until today.

In January 1924, an advertisement in the Cavalry Journal announced an essay contest. The purpose of the contest was "to get a plan to test competitively combat leadership of small cavalry units." The donor of the prize money, which was to be \$100, \$60, and \$40 to the first, second, and third place winners, agreed to provide \$1,000 to be awarded to the platoon finishing first in the competition that would follow the guidelines established by the contest essays and those guidelines established by the Cavalry School. Seven months later, in July 1924, Captain Royden Williamson, and Captain Wayland B. Augur were announced as joint winners of the essay contest. Eleven months after this announcement, the first Cavalry Leadership Test for Small Units was held at Ft. Riley, KS—the home of the Cavalry School.

elimination tests be held at troop level to insure that the best units competed for the prize.

On June 1, 1925, six lieutenants, representing the lettered troops of the 2d Cavalry Regiment of the 1st Cavalry Division, embarked on 5 days of tests designed to test not only their mental and physical ability, but also their proficiency in leading a platoon under simulated combat conditions. After a week of testing that included *march discipline, care of animals, security, reconnaissance, orders, tactics, and fire effects*, Lieutenant J.W. Wofford of Troop F emerged victorious, scoring 85.6757 points of a possible 100. Lieutenant Wofford was awarded a \$200 sterling silver service. Each sergeant in his platoon was given \$40, each corporal \$35, and each private \$28.18. These amounts do not sound large today, however, based on pay scales of that time, the prize amounted to approximately a month's pay. The first test was so successful that the donor of the prize money furnished funds to make the competition possible in 1926, at Fort



The Armor Leadership Award

by First Lieutenant Joseph T. Martin

The Combat Leadership Test consisted of two phases, individual and leadership. The Individual Phase was designed to demonstrate the courage, endurance, and ability of the platoon leader acting alone; failure to pass a given standard disqualified an officer from the leadership test. The Leadership Phase was "to demonstrate the qualities of prompt decision, aggressiveness, and ability of the officer as a leader, as shown by the evidence of proper training of his men."

The participants were chosen as follows: The Chief of Cavalry selected a division to sponsor the test. The division in turn selected one of its regiments to hold the test. Before the actual test, the Regimental Commander directed that

Riley, KS; and again in 1927, at Fort Bliss, TX.

The competition was so widely acclaimed by Cavalry Officers of the time that in 1929, the donor, Lieutenant Colonel Wickliffe P. Draper established a trust fund \$35,000 to be held by the First National Bank of Boston. The interest from the trust fund, expected to be over \$1,000 annually, was to be used to "promote combat leadership in the Cavalry of the Army of the United States, such combat leadership to be promoted by offering prizes for excellence therein."

Since 1928, the Draper Combat Leadership Trust Fund has provided prizes for excellence to small unit leaders in Cavalry and Armor. From 1925 to 1940, tests were con-

ducted annually except in 1933 when Army-wide maneuvers were held. During this period, enlisted members of the winning platoon received cash awards from \$28.50 to \$57.50 for sergeants; \$20 to \$45 for corporals; and \$14 to \$30 for privates. The winning platoon leader received an engraved silver plate or silver bowl ranging in value from \$75 to \$200.

The varying values of the awards was caused by an eagerness to expand the competition and afford more units the opportunity to participate. In 1932, the amount of funds available was divided into two allotments. One was given to the winning platoon from the 11th Cavalry stationed at the Presidio, Monterey, CA, and the other allotment went to the platoon winning the competition held by the 6th Cavalry stationed at Fort Oglethorpe, GA. Because there was no competition in 1933, the money that accrued was used in 1934 to fund four events.

From 1934 through 1940, the number of annual events ranged from two to four. Competition took place at such posts as Ft. Meade, SD; Ft. Clark, TX; Ft. Ringgold, TX; Ft. DeMoines, IA; Ft. Bliss, TX; Ft. Riley, KS; Ft. Knox, KY; Ft. Myer, VA; and Ft. Ethan Allen, VT.

Two of the units which held the competition in 1939 were mechanized cavalry regiments. Some facets of the test had to be changed to allow these units to participate; however, the same basic test guidelines, as established in 1925, were still followed.

One of the 1939 winners, Lieutenant Philip H. Bethune (later to be a brigadier general), had also won the Cavalry Rifle Platoon Competition in 1932. This competition was designed in 1929 and first held in 1930. The Cavalry Rifle Platoon Competition was made possible because money that accrued in the trust fund was more than that needed for the Leadership Tests. The Rifle Platoon Competition was to allow all regular regiments and squadrons not able to participate in the Leadership Tests a chance to compete for prizes. Competition was based on actual records achieved by the platoons in pistol marksmanship, swordsmanship, and rifle marksmanship during the year. Awards made to the winning platoon were an engraved trophy for the platoon leader and cash prizes for the enlisted members. Allotments of \$250 to \$300 were provided for this event. As best that can be determined, this award was only given from 1930 through 1932.

Leadership Tests were not held from 1941 to 1946, due to World War II. In 1946, responsibility for the fund was transferred from the Chief of Cavalry to Commanding General, Army Ground Forces and the name of the competition was changed from Cavalry Leadership Test to Armored Cavalry Leadership Test.

Competition was revived in 1947 with trophies going to platoons from the 2d Armored Division and the 3rd Cavalry Group. Concurrently, the tradition of giving cash prizes to the enlisted members of the winning platoon was discontinued.

Funds were made available to the Constabulary in Europe and to the Armor Center at Fort Knox in 1948, but because of the reorganization in the European Theater at that time, competition was not held. Awards of less than \$50 were made at the Armor Center to outstanding and distinguished graduates of leadership courses for officers and NCO's.

In 1949, Eighth Army of the Far Eastern Command held the Armored Cavalry Test. Trophies were presented to all members of the top three platoons from the \$1,500 allot-



ment made for the competition. The 2d Armored Division and the 3d Armored Cavalry Regiment held competitions in 1950. During 1951 and 1952, armored cavalry units from the Caribbean Command and the Armor Center vied for the trophies. The Armor School was also given money during these years to provide trophies for outstanding graduates. The Armor School was the only recipient of funds in 1953, 1954, and 1955 for awards to outstanding graduates who exemplified the characteristics of leadership.

In late 1955, Army Regulation 672-73, "Decorations, Awards, and Honors—Armor Leadership Awards," formalized the Draper Competition. The regulations stipulated that tests would be held to determine the best platoon in a designated Armored Division. At that time, the official name for the award became the Armor Leadership Award and provisions were made to allow National Guard Armored Divisions to hold the competition whenever designated to do so by the Commanding General, Continental Army Command.

Competition was held by the 1st, 2d, 3d and 4th Armored Divisions in the years 1956 through 1960 in Germany and the United States with elements of the 1st Armored Division holding the competition twice. Platoons were graded on physical training, military stakes, vehicle maintenance, individual appearance, and tactical operations. The platoon leader of the winning platoon received an engraved silver punch bowl and the platoon sergeant received an engraved silver tray. In 1957, 1959, and 1960, other platoon members received engraved silver cups and in 1956 and 1958 they received engraved wrist watches. Besides these individual awards, the platoon received a large \$3,750 perpetuating sterling silver trophy, which was designed and built in 1955-56. The parent company of the winning platoon retained the trophy for a year. (The parent company also received a plaque to keep permanently.)

In 1958, the Commanding General of 3d Armored Division who was responsible for conducting the competition was Major General Thomas F. VanNatta, who, 29 years before as a second lieutenant, had won the award when he commanded a platoon of Troop B, 7th Cavalry Regiment.

Two major disadvantages arose when the competition was held under the 1955 provisions. First, each Armored Division of the Regular Army and National Guard could expect to hold the competition only once every 10 years. This system excluded both regimental and divisional tank bat-



tations of infantry divisions and nondivisional tank units. Second, it imposed a heavy administrative and training schedule burden on the division holding the competition. Accordingly, this system was discontinued and the trophy was retired in 1960. It is now located in the entrance to the Armor School Headquarters, Gaffey Hall, at Fort Knox, KY.

To more adequately "promote combat leadership in the Cavalry (now Armor) of the United States," AR 672-73 was revised in 1960. The regulation reads, in part: "To promote combat leadership in armor units, the commander of each armored and infantry division, armored cavalry regiment, separate armored brigade (including mechanized brigade), and armored group of the Active Army, Army National Guard, and United States Army Reserve will select annually the outstanding tank company, tank troop, or armored cavalry troop of his command." This revised regulation alleviated the first drawback of the 1955 regulation: now, wherever there is an armored unit, there should be an Armor Leadership Award.

To eliminate the disadvantage of administrative burdens and training problems, the new regulation stipulated that the selection of the winning company would be based on applicable on-hand records such as annual general inspection reports, training evaluation reports, results of training tests, qualification in individual and crew-served weapons, disciplinary reports, etc. This system precludes the necessity to keep additional records or conduct additional tactical exercises. The unit commander is also given the freedom to assign as much weight as he likes to the factors he considers essential in the selection of a company.

A Draper Armor Leadership Plaque was designed for Army-wide distribution to the commander of each unit eligible to compete. The plaque was to be engraved with the winning troop or company designation and the commander's name who contributed most to that organization's winning of the competition.

The winner of the annual competition was designated as the custodian of the plaque until the next competition. The plaque provided space for 10 names and was to become unit property when filled.

Interest in the Armor Leadership Award gradually diminished until 1973, when the Assistant Commandant of the Armor School, Brigadier General Homer S. Long, sent reminders of the annual competition to all armored unit

commanders. In January, 1974, Colonel (Now Brigadier General) David K. Doyle, Commander, 3d Armored Cavalry Regiment wrote a letter in response to the reminder suggesting that the Goodrich Trophy Competition be revived and that the Goodrich Competition be held for cavalry units and the Draper Competition be held for tank units. The Goodrich competition was initiated in 1926 to increase interest in Cavalry training by awarding a trophy to the best trained troop of cavalry in the Army. The troop winning the competition three times was to be designated as the permanent custodian of the trophy. The rules of the competition were revised in 1936 to allow the cavalry regiment with three winning troops to retain the trophy on a permanent basis. Troop B, 3d Cavalry won the annual competition in 1936 giving the regiment the distinction of having units win the trophy three times. The Goodrich Trophy was retired and the 3d Cavalry was designated as its permanent custodian.

The Draper Combat Leadership Trust Fund Council, after studying Colonel Doyle's proposal, forwarded a reply pointing out that funds were not available to support a Goodrich competition, that the Draper Competition predated the Goodrich Competition, and that the Draper Competition was also originally dedicated to Cavalry units. The Trust Fund Committee proposed that the Goodrich Trophy be used as the award for the winner of the Draper Competition, rather than the gaudy plaque then in use, as a means of giving added incentive to the Draper Competition. By combining the Goodrich Trophy with the Draper Competition, the historic premise of leadership as demonstrated through effective unit training would be perpetuated.

Colonel Doyle enthusiastically endorsed the proposal. After coordination with the SJA, U.S. Army and the Chief, U.S. Patent Office, the Committee began a search for a contractor to produce replicas of the Goodrich Trophy so that each major command having armored or cavalry units assigned to it would have the capability of awarding a trophy in conjunction with the Draper Competition.

Replicas of the Goodrich Trophy have been produced for Army-wide distribution to the Commander of each armored and infantry division, armored cavalry regiment, separate armored brigade (including mechanized brigade), and armored group of the Active Army, Army National Guard, and Army Reserve. Commanders may request the new trophy by writing the Custodian, Draper Leadership Trust Committee, Fort Knox, KY 40121. The trophy will be forwarded promptly at no charge to the requesting unit. Then each commander should conduct an annual Draper Competition and award the new Draper Trophy on a rotational basis to the winning troop—or company-sized unit. The new Trophy has space for 10 unit inscriptions. Once this base is filled, a second base may be added for an additional 10 inscriptions.

In addition to furnishing funds for unit trophies, the Draper Trust continues to provide money for Armor School Award presentations. These awards are presented to students who have demonstrated "professional proficiency and leadership."

The Armor Leadership Award represents today what it did years ago. It recognizes the small unit leader as the man who makes the difference in a combat unit, and leadership in leaders "as shown by the evidence of proper training of his men."



VIETNAM MYTHS and Military Realities

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When the war in Vietnam ended, the United States government and the media began to promote a myth of a "peaceful" Vietnam. This myth was used to justify the withdrawal of U.S. troops and to encourage the return of refugees. However, the reality of the war was far more complex and brutal. The war had a devastating impact on the Vietnamese people, and the myth of a peaceful Vietnam was a dangerous illusion.

Puritan ethic, a lingering belief in the medieval "trial by combat" where God always intervened to insure that morality, truth, and right were victorious in any contest . . . and, conversely, where the loser was by definition immoral, false and wrong.

Dangers of the Myth

The root of the Vietnam mythology is that the war was illegal, immoral and unjust. From this root grew the second myth that the United States was unable to win and was forced to withdraw because of defeats on the battlefield. These then brought forth the poisoned fruit that the failure of conventional arms in Vietnam proves that conventional arms are not worth their cost since they cannot be relied on to protect American interests or gain American objectives.

"We lost sight of the fact that the alternative to democracy—imperfect as it was—was Communist totalitarianism."

It is this latter myth—that conventional arms are without value—that is the most dangerous to the future of mankind. It reinforces the American tendency toward isolationism, toward withdrawal from the problems of the world. At least part of this tendency stems from a feeling of helplessness, a feeling of inability to influence events at an acceptable cost. This feeling becomes a self-fulfilling prophecy when it translates into opposition to defense spending based on the mistaken belief that such spending is money wasted since military power is unable to influence events and is meaningless in today's world. It is a threat to world peace. It can increase the likelihood of war since it may encourage aggressors to challenge American interests, with challenges not sufficiently critical to warrant nuclear response, secure in the knowledge that conventional arms will not be used. It can therefore increase the danger of nuclear war, since at some point in time American interests will be sufficiently eroded that a response—even a nuclear response—will be the only alternative to surrender.

Myths and Realities

In order to demonstrate the fallacy of the myth that conventional arms are without value, it is first necessary to dispel the false perceptions upon which this myth is based. First, that the Vietnam war was illegal, immoral . . . the cruelest war in the history of mankind. Second, that the Vietnam war was a failure, a defeat . . . the United States was unable to win and was forced to withdraw because of defeats on the battlefield.

Myth: *The Vietnam war was illegal, immoral . . . the cruelest war in the history of mankind.*

Reality: *Several years ago, in a New York Times review of a long series of books on the morality of the Vietnam war, Neil Sheehan closed with the comment that, sad to say, none of the books would have been written if the United States would have won. There is, then, as we have seen, this impulse that our not winning is prima facie evidence that we were in the wrong. This is not a new phenomenon. Since the victor usually writes the official history, legality and morality normally have been on the side of the winner. For example, Tory perceptions of our own Revolutionary War could hardly jibe with our own.*

While at this late date arguments over the legality and morality of the Vietnam war are fruitless, there are, nevertheless, lessons to be learned from such arguments. These arguments point out a peculiar contradiction in the American character—the contradiction between our idealism that propels us to combat evil and promote freedom and democracy and our antimilitarism and isolationism that severely limit the means to achieve our idealistic ends.

It can be argued that such contradictions are a useful corrective—built-in checks and balances, as it were—that prevent overinvolvement on one hand or complete withdrawal from the world on the other.

This may be true, but it certainly complicates American foreign policy. It complicates the military posture necessary to support that foreign policy in peacetime, and it plays havoc with the military actions necessary when diplomacy fails. In the bitter and divisive public debate on Vietnam, the American people lost sight of the fact that we got involved in Vietnam for all the right reasons. It was idealism, not militarism, that motivated our initial impulses. Not idealism in the narrow or critical sense, but our deep-seated desire to support freedom and democracy in the world . . . the heartfelt convictions of most Americans that communism was demeaning to man's human dignity and should be resisted, particularly where force and coercion were the instruments of Communist expansionism. These ideals have weakened in recent years, but in the 1950's and early 1960's they were strong and dynamic moral impulses . . . impulses to be proud of.

Once involved, however, American idealism ran into two obstacles. The first was that the democracy we supported in Vietnam was less than perfect. A curious double standard emerged, where we held South Vietnam to high and exacting ideals, while we forgot that our own democracy was far from perfect. We forgot that our own democracy had taken centuries to develop. The stock answer to "How do we get democracy in South Vietnam?" should have been "Declare a Magna Carta and wait 700 years," but Americans are also impatient. We demanded democracy now, and when we couldn't have it, we withdrew our support. We lost sight of the fact that the alternative to democracy—imperfect as it was—was Communist totalitarianism. Where once we protested any restrictions on American newsmen by the Saigon Government, now all foreign newsmen are expelled and the press has become an instrument of the state. Where once we protested arbitrary justice by the South Vietnamese, now we take comfort in the fact that "Only a few top leaders have been executed." The Vietnamese knew what the real choices were. As a North Vietnamese soldier told Neil Davis of *The New Yorker*, "A lot of us hoped the South would win, because it would have brought about more freedom and reform in both countries."

"More freedom." Those are the operative words. In Saigon, even right before the fall, one could buy *Time* and *Newsweek*, *Stars & Stripes*, all kinds of foreign newspapers, and a host of Vietnamese newspapers—sometimes censored, sometimes not, but still remarkably free and outspoken—on the streets. There were dozens of foreign correspondents broadcasting their press and television coverage to the world. The Catholic and Buddhist opposition groups were active—not besieged in their own churches as today. There were active labor unions in South Vietnam. There were opposition political groups who openly expressed their frustrations. Yes, there was corruption. Yes, democracy and freedom in South Vietnam were less than perfect. But the corruption in the South was corruption of the pocketbook, not of the soul. Ultimate corruption is total control over man's life, over man's mind, over every facet of man's existence. As Solzhenitsyn has so vividly pointed out, this, not the humanitarian utopia they espouse, is the reality of communism. We knew that when we first got involved. But we forgot.

The second obstacle was our own idealism, our attempts to build a democracy in Vietnam were challenged by armed force. This challenge required either that we reply in kind or surrender our ideals. We chose to make a stand and, in doing so, human lives were sacrificed. This was in itself abhorrent and brought to the fore all our latent antimilitarism. This was exacerbated by television coverage of the war, coverage that brought the conflict directly into American living rooms. Unfortunately, this television coverage was confined to one side. Only occasional propaganda films came from the other side, since in a Communist society, television, like all the other media, exists only to serve the state. The viewer, then, was left with the impression that all of the horrors of war were being committed by our side alone. Logically, of course, this was completely one sided and misrepresentative, but logic had little to do with the case. By its very nature, television strikes at the viewer's emotions rather than his intellect.

Our tendency to see the Vietnam war as "the cruelest war in the history of mankind" revealed more about our imperfect sense of history than it did the war itself. Recall, for example, the agonizing over the phrase, "We had to destroy the town in order to save it." You would have thought that someone would have recalled the instructions General Washington received from the Continental Congress in 1776, "that a successful attack may be made on the (British) troops in Boston... in any manner General Washington may think expedient, notwithstanding the town and the property in it may thereby be destroyed."

The first obstacle is not so much the Army's problem as it is a problem of American attitudes. Paraphrasing Marx (Groucho, not Karl), we just won't have anything to do with any country that would have someone like us for a friend. We hold ourselves and our allies to standards of perfection. Yet, we hold our adversaries to quite another standard. We see only the surface calm, not the terrible price for the apparent calm. We once commented admiringly that "Mussolini made the trains run on time" and overlooked the atrocities of fascism. We can return from the Soviet Union and say "I have been to the future and it works" when the "future" was the ruthless execution of millions of Russian kulaks. We can marvel at the cleanliness, the order,

the lack of crime in Communist China, and fail to see the millions who perished to achieve that law and order. Compared to totalitarian dictatorships, democracy is sloppy, inefficient, and imperfect. It was Saigon, not Hanoi, that had political demonstrations, open charges of misgovernment, public disclosures of wrongdoing. It was Saigon that washed its dirty linen in public. But that does not make Hanoi better. It just means that North Vietnam, like their Soviet and Chinese brothers, did not oppress dissenters—they totally eliminated them. We must not only see the end, we must also assess the price paid to attain that end.

For the Army there is a lesson in the second obstacle. As military professionals we must speak out, we must counsel our political leaders and alert the America public that there is no such thing as a "splendid little war." There is no such thing as a war fought on the cheap. War is death and destruc-

"Vietnam was not so much a 'war' as a campaign in the unending competition between democracy and communism."

tion. The American way of war is particularly violent, deadly and dreadful. We believe in using "things"—artillery, bombs, massive firepower—in order to conserve our soldiers' lives. The enemy, on the other hand, made up for his lack of "things" by expending men instead of machines, and he suffered enormous casualties. The Army saw this happen in Korea, and we should have made the realities of war obvious to the American people before they witnessed it on their television screens. The Army must make the price of involvement clear *before* we get involved, so that America can weigh the probable costs of involvement against the dangers of noninvolvement... for there are worse things than war.

Myth: *The Vietnam war was a failure, a defeat. The United States was unable to win and was forced to withdraw because of defeats on the battlefield.*

Reality: *The first problem with this myth is that it pictures Vietnam as an end result, it fails to place Vietnam in perspective. Vietnam was not so much a "war" as a campaign in the unending competition between democracy and communism. Like Korea before it, Vietnam was a testing ground in this competition*

Korea was a test of whether the Communists could use open naked aggression to spread their doctrine. President Truman read this challenge for what it was, and America responded to the challenge. In his analysis of the Korean war, T.R. Fehrenbach commented "The Communist powers, notably Soviet Russia, would remember... After Korea, overt, brutal armed aggression, which had produced so violent—and unexpected—a counteraction from the West, would be avoided. Now the emphasis would be infiltration, subversion, and insurgency to gain Communist ends in the fringe areas; the trick was never again, as with

the South Korean invasion, to give the West a clear moral issue."

Vietnam then was a test of whether this new tactic, "Wars of National Liberation," would be effective in spreading their control. We knew that when we got involved, yet, as our involvement deepened, Vietnam became an end in itself. In the aftermath of the collapse of South Vietnam, we lost sight of the fact that it was a test. And we particularly lost sight of the fact that it was the Communists—not the United States—who failed that test. Soviet-style "Wars of National Liberation" were not "the wave of the future." There were not "one, two, three, many Vietnams" as the Communists had predicted. The Vietnam war—even though the Communists ultimately prevailed—proved that such wars were much too expensive, much too "iffy" to be used as instruments of national policy. As Mao Tse-tung had

"The American Army withdrew from Vietnam—as it had entered Vietnam—in response to the wishes of the American people."

found earlier in China, conventional war was still necessary to gain final victory. South Vietnam, for example, was ultimately defeated by a conventional military attack more allied to Hitler's blitzkrieg into Poland than to any guerrilla war effort.

The point to remember is that this competition will continue. The United States may have lost a "campaign," but the "war" is far from over. There will be new tests, new tactics. Angola may well have been a case in point. Here we saw, not unconventional warfare, but instead Soviet use of arms aid and assistance and use of surrogate Cuban troops to gain their ends. Our failure to put Vietnam in perspective, to see it as a test, also caused us to miss the significance of Angola. As Secretary of State Kissinger told the Senate in January 1976, "Angola represents the first time . . . that the United States has failed to respond to Soviet military moves outside their immediate orbit . . . Thus, to claim that Angola is not an important country or that the United States has no important interests there begs the principal question . . . our deeper concern for global stability."

Vietnam may be over. Angola may be over. But the testing, the challenges will continue. And we must have the means—and the will—to respond to these challenges.

The second problem with this myth is that the American Army was not defeated on the battlefield in Vietnam. The American Army withdrew from Vietnam—as it entered Vietnam—in response to the wishes of the American people. Although there was no *de jure* declaration of war, there certainly was a *de facto* declaration. For example, as late as March 1967, two and old-half years after Tonkin Gulf, a year after the beginning of the massive American troop buildup, a four and a half billion dollar Supplementary

Defense Appropriation Act—an explicit statement of support for fighting in Vietnam if there ever was one—passed the United States Senate by a vote of 89 to 2. It was the termination of this support from the elected representatives of the people—not enemy pressure—that prompted the American military withdrawal. This responsiveness to the will of the people should have enhanced, not diminished, the Army's image.

The argument over American military "defeat" misses the essential point. The North Vietnamese were not fighting the United States Army. They were fighting the United States. When an American Army officer, in Hanoi on the eve of Saigon's fall, reminded his North Vietnamese counterpart that "You must remember. You never defeated the United States Army on the field of battle," the North Vietnamese reply was "That may be true, but it is also irrelevant." His remarks point out a significant shortcoming. The American public, and even, at times, the military tend to think of war only in its military dimension, forgetting that there are other dimensions—political, economic, psychological—and that the outcome of a war may depend as much or more on the other dimensions as it does on the military dimension.

The Communist Tet offensive of 1968 is probably the classic case in point. The military claimed Tet-68 as a military victory for the United States—massive losses were inflicted on the Communists, Communist forces were quickly dislodged from all the positions they had seized, the decimation of the Viet Cong cadre who surfaced and led the attacks severely limited subsequent guerrilla activity, and the refusal of the South Vietnamese people to rise and join the Viet Cong, as the Communists had believed and predicted, indicated the failure of the revolutionary effect.

Yet, by the same token, Tet-68 proved to be a psychological defeat for the United States. After all our assurances of imminent victory, the Communists demonstrated their ability to mount a massive assault. Since reporting was confined to only our side, the American people could not see the havoc wrought on the enemy. They became convinced we were in a bottomless pit, that the war was unwinnable. Tet-68 represented the major turning point of American support for the war.

But another not so obvious point even better illustrates the multidimensional aspects of war. Applying the test of *cui bono* (for whose benefit) it can be seen that the real losers of Tet-68 were the South Vietnamese Communists (the Viet Cong or PRG) who surfaced, led the attacks, and were destroyed in the process. From Tet-68 on, the control of the war in the South passed to the North Vietnamese. Just as the Russians eliminated their Polish competitors by instigating the Warsaw Uprising, the North Vietnamese eliminated their southern competitors with Tet-68. They thereby insured that the eventual outcome of the war would be a South Vietnam dominated and controlled, not by South Vietnamese Communists, but by the North Vietnamese . . . an outcome that we can see taking place today.

Finally, it can be argued that the Vietnam war was not so much a repudiation of conventional tactics as reaffirmation of those tactics. We became so fascinated by what was new and unique about "Wars of National Liberation" that we failed to appreciate that many of the old principles still applied. Guerrilla war or no, it was still necessary to isolate the

battlefield, it was still necessary to cut enemy lines of supply and communication, it was still necessary to deny the enemy sanctuaries, it was still necessary to carry the war to the enemy's homeland. Caesar knew all of this when he went into Gaul. There was as much old in the war in Vietnam as there was new. General Giap's account of his final campaign to seize Saigon, for example, had more to do with Guderian's panzer tactics than it did with the tactics of guerilla war.

As we stated earlier, the major military error was the failure to communicate to the civilian decisionmakers the capabilities and limitations of American military power. There are certain tasks the American military can accomplish on behalf of another nation. They can defeat enemy forces on the battlefield. They can blockade the enemy's coast. They can cut lines of supply and communications. They can carry the war to the enemy on land, sea, and air. These tasks require political decisions before they can be implemented, but they are within the military's capabilities.

But there are also fundamental limitations on American military power. Critics notwithstanding, Americans are not imperialists, and the Congress and the American people will not permit their military to take total control of another nation's political, economic, and social institutions in order to completely orchestrate the war. While the United States attempted to influence these institutions in South Vietnam, the ultimate control remained with the South Vietnamese from the war's inception to the bitter end.

The failure to communicate these capabilities and limitations resulted in the military being called upon to perform political, economic, and social tasks beyond its capability while at the same time it was limited in its authority to accomplish those military tasks for which it was capable.

Another military error was our failure to communicate to the American people the harsh realities of war. Although it might sound paradoxical to civilians, the most "humane" way to fight a war is by the violent and overwhelming use of military force. Attempts to use force sparingly, to hold back, to gradually put pressure on the enemy, serves only to prolong the war and to ultimately increase casualties and suffering.

Further, the military failed to impress on our civilian leaders that wars—even limited wars—have serious consequences for the nations involved. As Fehrenbach pointed out in his study of the repercussions of the Korean war, "Every time a nation or a people commits its sons to combat, it inevitably commits its full prestige, its hopes for the future, and the continuance of its way of life." As we found to our sorrow, this remains true today.

It can probably be said that our fear of becoming involved in a land war in Asia led to our gradual response to the war in Vietnam, and ironically led to the very thing we feared—involvement in a prolonged land war in Asia. It can be said that our attempts to fight a war on the cheap, to have both guns and butter, to avoid mobilization, ultimately had precisely the opposite result and ended with far greater financial and societal costs than an initial total commitment would have cost.

We should have learned from our Korean war experience the difficulties of fighting other than a World War II-type great moral crusade. We should have been prepared for the difficulties of fighting a limited war. We should have learned

from the French experience the critical role of public opinion. But we are not a historical people—we had to learn it the hard way. And we did.

Myth: *Conventional arms are not worth the cost, they cannot protect American interests or gain American objectives.*

Reality: *This myth is the fruit of a poisoned tree. It grows out of two previous fallacies. It is potentially the most dangerous myth of all, since it can cripple American foreign policy, which depends on an undergirding of military strength. It can be self-fulfilling, since it can discourage defense spending on conventional forces and weaken the United States to the point where its conventional arms cannot protect American interests or gain American objectives. It can also raise the danger of nuclear war, since conventional arms provide the only alternative between surrender and nuclear war.*

The reality is that conventional arms, far from being

"Although it may sound paradoxical to civilians, the most "humane" way to fight a war is by the violent and overwhelming use of military force."

worthless, have played, and continue to play, an essential role in American security. Consider where the United States had *not* been challenged. It has not been challenged in precisely those areas—Western Europe and Northeast Asia—where we have made a firm and unmistakable commitment by stationing conventional forces.

This firm and unmistakable commitment is particularly important today. Consider that in the era of confrontation the boundaries between the free world and the Communist world were relatively firmly fixed. Although we were champions of liberty and freedom, we did not interfere in either Hungary or Czechoslovakia when those peoples rose against their Soviet oppressors. It can be argued that one of the reasons the Soviets backed down on Cuba was that Cuba was within our "boundary." Now, however, these boundaries are not so firmly fixed. Not being fixed they can only be determined by probing, by testing and reaction from the other side. This is the real danger of Angola. Was it a probe? Was it a test to determine the new American "boundary?" If so, our failure to respond to this test can have serious long-term repercussions.

Angola raises another interesting point. Many of the same American critics who hold that conventional military force is of little value raised objections to American involvement in Angola on the grounds that the Communist forces were too well armed, were too militarily powerful and therefore any American involvement was too risky, too dangerous. It would appear rather obvious that if military power had value to the other side, it would also have value for the United States... but, obvious or not, this point appears to have been overlooked.

Perhaps it is overlooked because of inherent American an-

timilitarism. As a people, we abhor "gunboat diplomacy." We like to think that there are better ways of projecting our influence. Psychological power—"The American Example"—was a particular favorite until we began to lose faith in ourselves. Economic power is also often discussed in this context. The world's prime supplier of food grains, the world's technologic leader, the United States has potentially powerful economic weapons at its disposal. The reality, however, is that we are loath to use either food or technology as weapons. Even in the face of economic attacks from the oil-producing nations, we have, in effect, practiced unilateral economic disarmament.

American worldwide interests demand an active foreign

"All of the discussion over American idealism, antimilitarism, isolationism; all the agonizing over American impatience, over American lack of historical perspective prove only one thing... that Americans are Americans."

policy, and an active foreign policy must be based on national power. By limiting the use of psychological power, limiting the use of economic power, we have increased the importance of military power. Therefore, it is essential that military power be kept in consonance with American foreign policy objectives.

American Military Realities

If the myths of Vietnam do not give an accurate portrayal of our Vietnam involvement, what then are the realities?

First and most obvious is the fact that the Vietnam war happened. Ignoring it, putting it out of our minds will not work. It will not go away.

The second reality is not so obvious. All the discussion over American idealism, antimilitarism, isolationism; all the agonizing over American impatience, over American lack of historical perspective prove only one thing... that Americans are Americans. These seeming contradictions in our national character make us what we are. There is no use complaining about these traits; instead, we must build our foreign policy and its supporting military policy on these facts of life. When we disregard this reality and build our policies on something we are not, such policies will not endure.

Third, Vietnam was a reaffirmation of the peculiar relationship between the American Army and the American people. The American Army really is a people's Army in the sense that it belongs to the American people who take a jealous and proprietary interest in its involvement. When the Army is committed the American people are committed, when the American people lose their commitment it is futile

to try to keep the Army committed. In the final analysis, the American Army is not so much an arm of the Executive Branch as it is an arm of the American people. The Army, therefore, cannot be committed lightly. It can only be committed when there is a consensus among the American people that vital interests of such critical importance are involved that the commitment of the Army is warranted. This means that these interests must be carefully and completely explained to the American people in terms they understand, in terms they agree with.

The fourth reality is that war is not something conducted solely by the military. There is no such thing as warfare limited to the military dimension alone, a point obscured by our own terminology. Vietnam was classified as a "limited war." What this meant was that the foreign policy goals—the ends—the United States wanted to achieve in Vietnam were limited. But "limited war" was interpreted by many people as meaning that the means to achieve that end were limited to military factors alone. This is a dangerous fallacy. All wars are "total wars" in a sense that they have political, economic and psychological dimensions that may be equally as important as the military dimension. Because of the peculiarities of our national character, the capability of the American military to deal with these other dimensions is severely limited. There are certain things—political involvement, for example, or manipulation of the media in order to shape public attitudes—that the American people believe are just not proper military roles. War—and even rivalry and competition—requires a coordinated and orchestrated national effort, with the military concentrating on military tasks, while other agencies of the Federal Government take on the political, economic, and psychological tasks.

The final reality is that while the phrase "Cold War" has fallen into disuse and disfavor, the rivalry and competition between the United States (and its allies) and the Soviet Union (and its allies) still continues. While there may be some relaxation of tension, there is no end to this competition in sight. Korea was a campaign in that competition. Vietnam was another campaign. Angola may well have been a third campaign. The likelihood is that there will be other campaigns, if not between the principals at least between the allies of these principals. As long as American military power is strong enough, direct challenges to American survival or to American freedom of action will probably not be made. But we can count on the fact that our boundaries will be probed, our responses will be tested. If we fail to respond we can anticipate a constant slicing away, each slice not significant in itself, until our very existence is threatened.

The American people must understand these realities.

The Army exists to serve them, to serve their interests.

There is a direct relationship between their freedom and democracy and the maintenance of adequate military power.

There is a direct relationship between their economic well-being and their support of adequate military power.

Their well-being is inexorably tied up with the well-being of our allies—even our imperfect allies—and both are dependent on military power.

Only when Vietnam is put in proper perspective and the realities of our involvement are understood will the malignant myths that are eating away at our moral fiber be excised and America regain her full strength to deal with the problems that lie ahead. ▲

The Forgotten Mission

by Colonel William V. Kennedy



Air support for the U.S. Army is a vital function of the U.S. Air Force, but it is hard to run an Air Force and provide that support when your airplanes are being blown up with satchel charges and your pilots and mechanics are being machinegunned in their bunks.

The U.S. Forces in Vietnam found themselves in a somewhat similar situation in the early 1960's. If we do not pay attention to the lessons supposedly learned then, we could find ourselves in a worse fix in the future.

Almost a decade before the Vietnam deployments began, a Strategic Air Command lieutenant returning from a snowshoe hike took a wrong turn and found, when he broke out of the tree line, that he was within rifle shot of three of his unit's bombers, guarded by a lone sentry who was peering from under the hood of his parka in the opposite direction.

Out of that incident came a staff study proposing organization within the Air Force of an Armored Cavalry-type unit for air base defense. The staff study was forwarded with the strong support of the wing commander. Back came the reply. "Let the Army worry about that sort of thing. Your business is flying."¹

When the all-too-predictable series of disasters began in Vietnam, the Air Force had no deployable security forces. The Air Force *Security Police Digest* reported in 1968 that "it was necessary to meet the requirement through a man-by-man, piece-by-piece accumulation of Security Police personnel and equipment . . . The forces comprising this buildup were neither trained, organized, nor equipped for this unique security and base defense task."

The Air Force had planned to use its normal operating complement of air police, mechanics, cooks, truck drivers, clerks, etc., for local security. Attempts to put this concept into operation in Vietnam proved to be so dangerous that it became necessary to disarm most of the ostensible defending force.

It became apparent that the U.S. Army could not spare the

combat forces required to secure the air bases, and that the South Vietnamese could not provide adequate forces in all cases. Thus, in July 1967, the Chief of Staff of the Air Force approved a new Combat Security Police Program. This was to consist of a wing headquarters, a training school, and 10 squadrons. Each squadron would consist of 559 officers and airmen divided into three flights of six officers and 160 airmen each.

The basic element of the Air Force program would be a five-man fire team.² Singly or in multiples, the fire teams were to conduct aggressive reconnaissance beyond the base perimeter. They were to employ a variety of warning devices, weapons, vehicles and communications to "detect, intercept and destroy" intruders. The adoption of armored cars took the new squadrons a long step toward a Cavalry-type structure.

For a while, it began to look as though the Air Force was on its way to incorporating an effective ground defense force into its permanent force structure. There remained, however, some lingering doubts.

"Many combat security police personnel felt," one Air Force writer comments, "that the Air Force, if faced with a choice between reducing a flying or support capability it would probably choose to reduce the latter."³

Sure enough, in 31 December 1969 the fledgling Air Force base defense force was budgeted out of the nest.

We are back now where we started. There is no clear responsibility assigned for air base defense in the "roles and missions" documents, although JCS Pub 2 assigns to the Army the mission to seize, occupy and defend land areas. The nearest thing we have to an established doctrine is Marine Corps Manual FMFM 8-3, "Advanced Naval Base Defense." Yet there are significant differences between an advanced naval base, with its support from the fleet, including the Fleet Marine Force, and an air base out in the middle

² *Security Police Digest*, Hq. U.S. Air Force, AFRPI25-2, 1968 Summer Edition, p. 21 (Photo and Caption portray the 5-man team)

³ Lieutenant John J. Doran Jr. USAF, "Air Base Defense: A USAF Requirement in the 970's," Air War College, Maxwell AFB AL, 1971

¹ Message from Headquarters, U.S. Eighth Air Force as shown to the author by Commander, 42d Bombardment Wing (H) (SAC), April 1954 (ca.)

of nowhere, vulnerable from every side by infiltration and to the furtive mortar or rocket team. In the type of fluid theater-level conflict that can be anticipated in the future, attack of "rear area" air bases by marauding enemy Air Cavalry and Armored units operating separately or in concert cannot be ruled out.

The central fact of air base defense is the inherent vulnerability of aircraft on the ground. Retention of terrain, therefore, is not enough. The defending force must be able to insure continuity of flight operations by keeping direct and observed fire off the base. This has the effect of expanding the area to be controlled beyond the limits of any comparable size installation in the theater. A division could be tied down in such an operation. Since it is unlikely that we will enjoy such luxury, an economy-of-force unit must be substituted. That brings us back, once again, to the Cavalry.

The Vietnam experience seems to have demonstrated conclusively that the U.S. Air Force is disinclined to seek out the air base defense mission. This seems to guarantee that when the need arises again, it will be of an emergency nature and it will result in the diversion of U.S. Army forces. It is very much in the Army's interest, therefore, that it address itself to the problem of air base defense and to the development of a force that will minimize the diversion of Army resources from the main land battle.

Fortunately, there is available for study just such a force in the form of the Royal Air Force Regiment, tried and proven in every conceivable type of terrain over a period of over half a century.

The antecedents of the present RAF Regiment were No. 1 and No. 2 Armoured Car companies formed by the RAF in 1921 and 1922, respectively, in Iraq and Transjordan. This was, in part, an outgrowth of Sir Hugh Trenchard's proposal that the RAF supplant British and Indian Army garrisons as the Empire's peacekeeping force in the Middle East. The success of the Trenchard plan was to become an important element of the "victory through air-power" theories of later decades. The theorists, however, chose to overlook the role of the armored car companies both in securing the RAF operating bases and in providing the land element of combined-arms team.

In 1933, responsibility for defense of airfields against low-level air attack was assigned to the RAF. At first, this was carried out with little thought for formal organization, structure, or training. Heavy losses of aircraft on the ground in France in 1940 and the inability of the Army to provide full, continuous coverage of airfields in the United Kingdom led to creation of organized RAF light anti-aircraft squadrons.

In May 1941, German airborne forces attacked and seized the island of Crete, signalling yet again that installations and terrain once considered safe from direct assault except by long-range bombardment were now subject to capture as well as destruction. In response, the British pulled together the several loose ends of their air base defense system and on 6 January 1942, a Royal Warrant was issued creating the Royal Air Force Regiment.

This is a remarkably comprehensive force. It incorporates both ground defense and low-level air defense. The regiment is responsible for training all RAF personnel in ground defense, including nuclear, biological and chemical defense. The regiment provides crash-fire rescue teams where civilian crews are not feasible. There is a small parachute

A RAF Regiment patrol discovers native culture near Jaffa, Palestine (1947).



The Humber Airfield Patrol, No. 3 Squadron, RAF Regiment, police an airfield in Germany (1947).

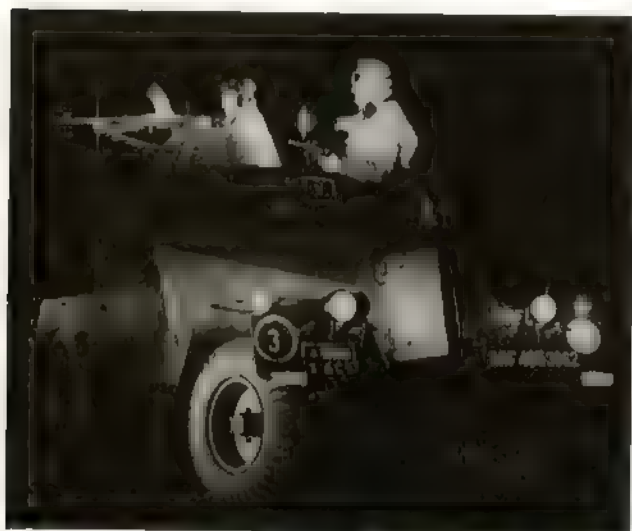


unit trained to assist in seizure and defense of advanced air bases. There are sub-units of 30 men each to support paramedic, jungle and desert rescue teams. Staff officers of the regiment serve at the Ministry of Defense and in RAF Group and Command headquarters.

The principal operational units of the RAF Regiment are the Field Wing Headquarters and the Field Squadron. The Wing headquarters is a small tactical element capable of controlling ground defense squadrons, air defense squadrons, and attached units from other services. The Field Squadron is a company-size unit—essentially a ground Cavalry troop—mounted in armored cars and Land Rovers with extensive automatic weapons, communications and surveillance capabilities. Low-level air defense units of the regiment are similarly organized. They have a secondary mission of ground defense. When the air defense squadrons were armed with the *L40/70 Bofors*, this was a formidable



A Morris Type E car of the RAF Regiment patrols an air base in England (1942).



Equipped in Rolls Royce Type A armored vehicles, the British RAF Regiment's A/Cav column moves across the Western Desert (1940).



capability. The air defense squadrons are now armed with the *Rapier* surface-to-air missile. A triple-capable antitank, antipersonnel and anti-air missile would be just the thing.

The type defense element of an air base consists of a Field Wing Headquarters with three Field Squadrons attached. In addition to the ground squadrons and the air defense squadrons in their secondary role, the Wing plans and directs the overall ground defense resources of the station complement.

Although identified with fixed installations, the history of the Royal Air Force Regiment is not that of an outfit that sits on its air base waiting for the enemy.

As mentioned earlier, the RAF armored car companies that were organized in 1921-22 became part of what was probably the first air-ground combined-arms team. No. 2 Company, in concert with aircraft of No. 14 Squadron, turned back an invasion of what is now Jordan by the

Wahabi revivalists in 1924.

In addition to the all-British units, the RAF organized similar units, called the Iraq Levies, consisting of British-officered Assyrians with an admixture of Arabs and Kurds. This force ultimately totaled 11,000, further bringing into question the claims of air-power extremists that the RAF peace-keeping operations in the Middle East during this period were conducted exclusively by airplanes.

During World War II, the two original armored car companies broke up an Iraqi attack on the RAF base at Habbaniya and went on to perform service as armored cavalry in the Western Desert. During the advance to Tunis, they operated with or ahead of the Army advance guard, seizing and defending bases for the fighter squadrons. Both units were formally incorporated into the RAF Regiment in 1946.

Field squadrons of the RAF Regiment deployed directly from the United Kingdom were the first British units to enter Bizerte and Tunis in 1942. Two squadrons participated in the invasion of Sicily and another landed at Salerno. No. 2908 Squadron landed in Greece in September 1944, surprised the German garrison at Patras, sank a German torpedo boat with antitank guns and went on to perform pursuit operations all the way to the Yugoslav border. Other units got involved in the Greek civil war, engaging in street fighting and in the relief of a beleaguered RAF headquarters.

Two wings of the RAF Regiment landed at Normandy on D+1. With later arrivals, they secured airfields, participated in mine clearance, and, on several occasions, held front-line sectors. They covered the withdrawal of RAF air-defense radar units during the Battle of the Bulge. During the advance into Germany in 1945, units of the regiment repeated the earlier successful exploitation in the Western Desert by seizing Luftwaffe installations, equipment, and key personnel. This involved in one case a forward passage of lines by nine RAF Regimental task forces.

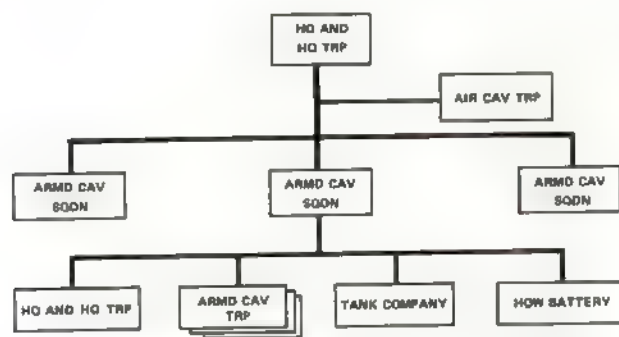
No. 1307 Wing participated in a pitched battle with Japanese forces at Meiktila in Burma. With No. 1330 Wing, it took over responsibility for the Army's main supply route. Later, No. 1307 Wing assisted the Army in mopup operations. This same unit was airlifted into Saigon in October 1945 and blocked seizure of the airport by what were to become known as the Viet Cong, an action that American Armored Cavalry forces were to help duplicate on a larger scale during the 1968 Tet Offensive.

When the Malaysian "emergency" broke out in 1947, locally enlisted Field Squadrons were raised in Malaya, with British officers and NCO's. These rotated between airfield defense duties, terrorist-hunting in the jungle and guard duty at Kai Tak Airfield, Hong Kong.

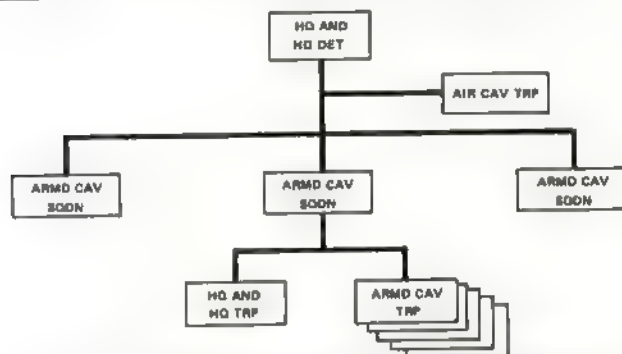
When trouble broke out in Cyprus in 1963, No. 3 Wing established a truce line employing five Field squadrons of the RAF Regiment, two armored car troops of the 14th/20th Hussars, a battery of the Royal Horse Artillery and a company of the Sherwood Foresters.

During all this time, these and other units of the RAF Regiment stood ground and air-defense watch at a host of RAF stations, radar sites, and forward air strips throughout the world.

The RAF Regiment is, in everything but name, a true Cavalry force. It has incorporated and demonstrated in admirable fashion the flexibility of mind and organization, the offensive spirit and the understanding of the principles of



THE ARMORED CAVALRY REGIMENT AS ORGANIZED AT PRESENT



PROPOSED REVISION FOR AIR BASE DEFENSE DOCTRINAL DEVELOPMENT

mobility, security, and economy of force that are hallmarks of the Cavalry. Out of this impressive record there would seem to be two very valuable lessons.

- The Regiment has demonstrated that airfields can be effectively defended by Cavalry-type formations high in technology, but low in total manpower.

- Properly organized and equipped, air base defense units can perform a wide variety of missions, by no means limited to their primary role.

Hopefully, the United States will never again become involved in a large continental war. If such a war does occur, however, it almost certainly will be characterized by large fluid zones on either side of the nominal "front." The security of installations, in particular air bases, in that zone will be a matter of critical concern. It is apparent from past performance that the U.S. Air Force, without the assigned mission, will not go the route of the RAF and create an internal force adequate to this task. The job will go to the U.S. Army. If the Army does not recognize the importance of the mission in time, it will face the diversion of large numbers of troops at a time when it can least spare them.

What can be done?

The first step would seem to be to resolve the question of who is responsible for defending air bases against ground attack. Since the Air Force has no assigned role in this regard, the Army should obtain a clear charter.

At present there are three Armored Cavalry regiments in the National Guard. At least one of those regiments could be directed to plan and train for the air base defense mission without seriously disrupting the deployment schedule. Some reconfiguration would be required. Based on the British experience, it would be reasonable to convert the regimental headquarters to an administrative mission and to reorganize the squadron headquarters on the model of the RAF Field

Wing Headquarters. Spaces saved could be used to increase the combat strength of the Cavalry troops. The tank companies and howitzer batteries should be reorganized and redesignated as Cavalry troops.

A most crucial question to be resolved in developing a U.S. air base defense force concerns the role of the helicopter and its place in the organizational structure. The role is perhaps easiest to determine. South aircraft would be needed to work in conjunction with ground patrols. A force of troop-carrying helicopters and gunships would be needed as a quick-reaction force. Whether these would be assigned to the squadron headquarters or distributed among the Cavalry troops would be a matter of trial and test. The present regimental N Troop and other regimental aviation elements are adequate to support all of the experimentation necessary. To carry out these and related experiments, it probably would be necessary to support the regiment with a small active Army planning staff.

It is possible, therefore, for the Army to begin to develop doctrine and organizational structure for the air base defense mission without spending a dollar more than is being spent already on a National Guard Armored Cavalry Regiment and its advisers. Indeed, some saving might be realized by deleting service practice costs now associated with the tank companies and howitzer batteries. Even larger savings might be realized in annual training costs since it no longer would be necessary to take the entire regiment to and from some distant training site. Where a suitable local training site is available, most training could be performed on a troop basis, using the present 15 days of annual training in increments to expand the present one-weekend-per-month drill schedule.

Out of this arrangement the Army would acquire not only trained units configured to the air base defense mission but, perhaps more important, a substantial cadre for expansion in the event of a major war. During World War II, the RAF Regiment reached a peak strength of 85,000 in 240 operational squadrons. The United States easily could be required to reach or exceed those totals in a future conflict.

The losses of aircraft on the ground that we experienced in Vietnam could be relatively insignificant compared to what we could lose from a single coordinated attack by armored and air cavalry units conducting a future "ride around McClellan." The RAF Regiment has shown that such losses can be avoided. We would be foolish not to take advantage of that hard-earned experience.



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by Captain Andrew J. Bacevich, Jr.

About three years ago, the United States Army embarked upon a thorough renovation of its tactical doctrine. Turning with relief from the frustrating conundrum of counterinsurgency, the service took a fresh look at the demands of more conventional forms of land combat. To the extent that Southeast Asia had absorbed the Army's attention and sapped its energies for a decade, such a reassessment seemed long overdue. Certainly, conflicts fought on the other side of the globe, notably in 1967 and 1973, had both revealed important new lessons and reconfirmed old axioms, all of which were equally foreign to a generation of American soldiers familiar only with the unconventional environment of Indochina. Young and old soldiers alike have greeted this reorientation of the Army's focus as a positive and healthy development. The purpose of this article, however, is to sound a cautionary note, to suggest that in zealously preparing for the "next war" we remain open to the full range of contingencies that may confront us.

Unquestionably, the current doctrinal reappraisal has injected a welcome sense of realism into the services' preconception of combat in Europe or the Middle East. The Army, we are incessantly reminded, will fight the next war outnumbered. It will fight on a battlefield proliferated with weapons systems of mind-boggling lethality. Survival—and victory—will belong to the skillful: to the cavalryman who carefully uses every available wrinkle of terrain; to the tank crew which consistently shoots first and accurately; and to the commander who adroitly coordinates the spectacular resources of the combined-arms team. The first battle of the next war will be decisive: that is the battle to begin preparing for today.

This is exciting stuff. And it is gratifying to see the excitement translated into tangible, long-needed reforms. Challenging "battleruns" now supplement the stylized rituals of tank gunnery. Rigid tactical formations have been discarded in favor of control methods that are both simpler and more flexible. ("Follow me, and do what I do.")

Yet, however refreshing these innovations may be, it is worthwhile to examine the assumptions upon which they are implicitly based. Exactly what sort of conflict will the "next war" be? It will be brutally short, we are told, decided within a few weeks or even days of the onset. Restraints on the employment of non-nuclear weapons will be virtually nil. Superior hardware in combination with superior skill will guarantee a favorable outcome. In short, we anticipate that the next war will possess a specific "character"—brief, extraordinarily violent, sensitive less to the quantity than to the quality of applied battlefield technology, and above all, *conventional*.

But nagging questions remain. How confident can we really be that the next war will adhere to this conventional character? Is our estimate the product of a reasoned assessment of contemporary strategic realities? At first glance, the case made by advocates of the conventional scenario is a persuasive one.

Each succeeding round of Middle Eastern violence undeniably drags the United States deeper into the affairs of that tumultuous and unstable region. Our enormous political and economic interests there perhaps genuinely merit that tired modifier "vital." With stakes so high—and political winds so capricious—the nation's prospects for avoiding further involvement are difficult to predict. The most recent Arab-Israeli wars, however, do suggest that future Middle Eastern conflicts—whether including the United States or not—will assume the conventional character we anticipate.

Meanwhile, the United States firmly maintains its commitment to Europe—the classic cockpit of conventional war. Across the Iron Curtain, the Warsaw Pact implacably strengthens already ample forces. Even at a time of allegedly reduced tension, this elaborate program of expansion and modernization is a worrisome development. And here too, if hostilities break out, they will initially conform to the American conventional model.

Even if an American war *today* is either European or the

Middle East seems unlikely, involvement in the foreseeable future—whether through conscious choice or miscalculation—is distinctly feasible. To this extent, then, those who argue that the Army must prepare for conventional war are on solid ground.

"...we have transformed conventional war into something more than mere feasibility. Rather, it is rapidly becoming an obsession."

Yet it is no exaggeration to say that we have transformed conventional war into something more than mere feasibility. Rather, it is rapidly becoming an obsession. The service is making its expectations for conventional war the fundamental assumption upon which all other decisions are predicated, from procurement, to force structure, to training. We design our tanks, constitute our units, plan our FTX's to conform to the perceived exigencies of the conventional scenario.

Ironically, this elevation of the merely feasible to the level of fixation might well be attributed less to the Army's current preception of Europe or the Middle East than to an instinctive backlash against its ordeal in Vietnam. Perhaps such a reaction was inevitable. Russell F. Weigley has observed in his authoritative *History of the United States Army* that the service's attitude toward unconventional war has followed a clearly identifiable "historical pattern." The Army's experience with unconventional warfare has been varied and extensive: as guerrillas during the Revolution, more frequently as counter guerrillas as in the vicious Seminole War of the 1830's, or the taxing Philippine Insurrection. Yet for all its experience, the service has tended to view such warfare as "incongruous to the natural methods and habits of a stable and well-to-do society." In the final analysis, suggests Professor Weigley, the Army has looked upon unconventional conflict as "abnormal" and has tried "to forget about it whenever possible."

Today, the Army—like the nation as a whole—has set about forgetting Vietnam with a vengeance. The national urge to blot out the very memory of Indochina is understandable. In a sense, the Army has more to forget than most. After a decade of exhausting effort and bitter disillusionment, of wrenching internal stress and dwindling external support, the service's reward was to be dubbed a principal scapegoat. The Army's purported sins run the gamut from genocide to the creation of a generation of American drug addicts. Even today, when the rhetoric has cooled considerably, the prestige of the profession and the self-confidence of many of its members are not fully restored.

Vietnam scars the memory of American soldiers.

What was it all about? What went wrong? What, if anything, remains to show for the sweat, blood, and treasure so freely invested? There are no harder questions than these. Understandably, they are questions which the profession has been reluctant to confront. We are unwilling to tear open wounds so recently and tentatively healed.

But it is precisely this yearning to forget a painful unconventional war that invests the conventional alternative with such extravagant credibility. The post-Vietnam reaction has subtly distorted the Army's perspective. It has imperceptibly

transformed conventional war, admittedly a feasible contingency, into a sure bet because—in contrast to Vietnam at least—it is the kind of war the Army *wants* to fight. After a lamentable experience with another "abnormal" war, we are more certain than ever that *conventional war is our kind of war*.

Vietnam, for instance, indicated that the American people will not support a long war when they believe that our national security is not a stake. Thus, the presumed brevity of modern conventional war becomes particularly attractive in contrast to the apparent interminability of unconventional conflict. In a short war, we will maintain a solid core of popular support. (A skeptic would note that historically those who have ventured to forecast short wars have won few plaudits for their accuracy.)

The next war's very conventionality is an appealing alternative to counterinsurgency. Instead of burdening soldiers with an irksome assortment of nonmilitary responsibilities, it promises a straightforward solution by arms alone. Conventional war implies simplicity: the Army will win by destroying the enemy, not by worrying over his politics.

Finally, there is the confidence—perhaps a residue of World War II—that a conventional war will permit the United States to capitalize on its strong suit. Accurate fires, superior mobility on and off the battlefield, and tactical flexibility—matchless products of American technology—would combine with American professionalism to achieve decisive results. Again, the contrast with Vietnam is vivid. There, our mechanical wonders, however energetically employed, remained ultimately irrelevant. The decision so earnestly pursued was achieved only in the aftermath of our withdrawal—and then it was hardly the one we wanted.

Yet having granted both the feasibility and comparative attractiveness of conventional war, why should it be objectionable for the Army to concentrate on that contingency? And what difference does it make whether or not the Army's convictions are in part the product of its ordeal in Southeast Asia?

Quite plainly, the objection is this: the chances are high that the next war will be anything but conventional. Indeed, whether or not the prospect is an appealing one, the "next" war may well be quite like the "last" one.

The rationale behind this contrary view is simple. Con-

"...unconventional war is the surest way to beat the United States."

sider first the proposition that the United States will remain on the strategic defensive for the foreseeable future. When it comes to choosing the battlefield for the next war, the option will be our adversary's. In postulating a conventional war, the Army assumes that its enemy will choose the type of war for which the United States is best suited and most prepared. Is this a likely prospect?

If our adversaries have derived a single lesson from Vietnam, it must be that *unconventional war* is the surest way to beat the United States. While an expensive and protracted process, its effectiveness is proven. Moreover, unconventional war in whatever guise—organized terror, urban insurgency, national liberation movements—has the additional virtue of being a low risk policy. Especially when sur-

rogates can be recruited to do the fighting, it is virtually a "can't lose" proposition for the sponsor. Constraints imposed on the United States provide a reasonable assurance that the dimensions of the conflict will remain within carefully defined limits. The world will not go up in smoke. Our adversary's national existence will not be seriously threatened.

In addition, potential enemies surely recognize that un-

"Nothing would erase the current malaise of the western community more effectively than to be the victim of a direct military assault."

conventional war minimizes the effectiveness of American hardware while putting a premium on intangibles not subject to mass production by American industry. Neither the Army nor the nation has shown itself terribly adept in dealing with such sensitive issues as colonialism, racism, and economic exploitation. We are at best uncomfortable and at worst vulnerable to legitimate criticism for the way we have handled these matters within our own country.

Conversely, the type of conventional war so attractive to Americans is likely to evoke less enthusiasm among our rivals. To provoke the United States into a European or Middle East war would be an extremely risky venture. Nothing would erase the current malaise of the western community more effectively than to be the victim of a direct military assault. Further, the ensuing conventional battlefield would enable the United States to utilize its highly sophisticated arsenal with maximum impact. More ominously, regardless of the outcome of the conventional struggle, the probability of uncontrolled escalation into nuclear conflict would be high, especially in the European scenario. Obviously, such a war would be a "can't win" proposition for bystanders and belligerents alike.

From our adversaries' point of view, unconventional war is a far more promising option. It has a proven record of success. It lacks the degree of risk and uncertainty inherent in conventional war. In short, its attributes offer compelling incentives to continue their application.

To accept these assertions is not to preclude the possibility of conventional war. The case made above for conventional war is a legitimate one, but only insofar as it goes. We cannot ignore the possibility of such a conflict. Indeed, our preparedness is the surest way to defer conventional aggression.

Nonetheless, while the Army's present preoccupation has useful aspects, the concurrent tendency to disregard unconventional war is dangerous. It puts us in the position of ignoring an enormously viable technique for which we have yet to devise an effective counter. For the reason above, the Army cannot afford to forget Vietnam. Regardless of how distressing the prospect may be, the service must re-examine its experience, answer the hard questions, and resolutely prepare to engage in unconventional warfare within the foreseeable future. Needless to say, the real challenge is to do it right the next time.

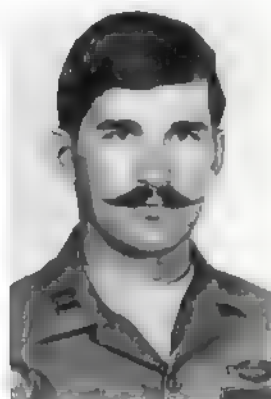
To advocate that the Army actively maintain the capacity to check unconventional aggression is not to propose a national strategy of spreadeagle interventionism. One can argue, of course, that *any* preparation for unconventional war makes little sense in light of the popular hostility toward anything remotely resembling another Vietnam. Surely Angola is an unequivocal reminder of the popular antipathy toward intervention. (Angola likewise confirms the continued potency of so-called wars of national liberation.) But this sensitivity will inevitably decline. In the aftermath of the Korean war, Americans had bitterly resolved never to become bogged down in an indecisive Asian adventure again. Obviously, by the early 1960s, that resolve had already dissipated.

The current hostility to intervention might well be more enduring. It is equally possible that it may have an unexpectedly short life if American timidity encourages other nations to become more blatantly ambitious. Yet the duration of the attitude is unimportant. The crucial point is that the probability of again confronting the enigma of unconventional war is high. If the Army fails to broaden its thinking to encompass that contingency, it risks responding to it with doctrines rendered inadequate by our conviction that there is only one kind of war—"our" kind of conventional one. Paralyzed by the frustrations of Indochina, the service runs the risk of being no more successful in the next war than it

"Do not repeat the tactics which have gained you one victory, but let your methods be regulated by the infinite variety of circumstances."

was in the last one. To pretend that the disaster never happened or that it cannot happen again is to invite its recurrence.

A centuries-old aphorism more than merits our consideration today. "Do not repeat the tactics which have gained you one victory," Sun Tzu warned us, "but let your methods be regulated by the infinite variety of circumstances." For the United States Army, one of the more probable circumstances remains unconventional war.



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The Nemesis of the Panzer Armies

by Robert P. Arnoldt

In order to fully appreciate the development of the Russian *T-34* tank and its impact on German armor design and employment during World War II, J. Walter Christie and his unique ideas on tank warfare must be briefly reconsidered. It should be realized that Christie's basic designs, embodied in machines like the *T-3* Infantry tank of the early 1930's, are the direct linear ancestors of the *T-34* and its modern-day descendant, the Russian *T-62*.

Unappreciated in the United States and constantly at odds with the United States Army, Christie's unconventional ideas, like the elimination of the turret to lower vehicle silhouette, left him out of the inner circle of those who supported "accepted" doctrine at the War Department. While the conservative U.S. Military was turning a deaf ear on Christie's proposals, Germany had realized what the tank, and masses of tanks, could accomplish. *Blitzkrieg* was being born while American ideas on armor were still intermingled with the horse cavalry and support of infantry.

But in the end it was Russia, not Germany or the United States, that would develop and expand Christie's machines and ideas. In 1931, even though Christie was cool to the idea of his designs leaving the United States, the Red Army purchased two *M-1931 (T-3)* tanks. This purchase was the result of lasting good impressions made on a Soviet Commission headed by the Director of Mechanization and Motorization of the Red Army. The Christie Wheel/Track suspension design, which offered wheeled speed on roads and tracked performance on broken terrain, was a key factor in the Commission's decision to buy. Time would show however, that this suspension feature was not to be the ma-

jor ingredient in the success of the Russian/Christie tank development program.

The Russians needed a vehicle that could be useful in the vastness of Russia, notwithstanding the wide variations of weather and terrain. Extensive testing of the Christie *T-3*'s reinforced the original Soviet interest in the sturdy, agile machines, resulting in a home-built version, the *BT-1*, that was produced in June 1931 at the Komintern factory in Kharkov. At this very time, in most of the western industrial countries, military ideas of mobility and the offensive spirit still revolved around horse cavalry and the "Bayonet School" of thought.

The next two prototypes, designated *BT-2* (*Bystrochodniya Tankov* or fast tank) were completed by September of the same year. Stiff but successful testing followed completion of these *BT-2*'s, and they were later unveiled in the annual parade in Red Square.

Manufacturing facilities for the mass production of *BT* vehicles were ordered and became an essential part of the second Five Year Plan. Production was initially concentrated at the Komintern factory, although eventually *BT*'s were in production at 32 major tank plants. In all, seven *BT* models, with numerous modifications and changes, were produced from 1931 through 1939. The models adopted for service with the Red Army were the *BT-2*, *BT-5*, *BT-7* and the *BT-7M*.

From 1936 onwards, M. I. Koshkin was chief designer at the Kharkov factory, which was the main producer of *BT* vehicles. This engineer-designer carried out extensive modernizing on the basic machine, including the introduc-

tion of the *BD-2* Diesel engine, the mounting of a 76.2-mm main gun, the fitting of an inverted "V" glacis plate to increase front protection and making provision for a hull machinegun mounted next to the driver's position. The turret width was increased to allow the mounting of the 76.2-mm main gun, and its rectangular mantlet. The most radical design change that was made marked a distinct departure from the original Christie models. This change was the elimination of the machine's ability to travel on tracks or wheels. The wheeled mobility was discontinued in order to further develop the tracked potentials offered by the *BT/Christie* basic suspension. With this primary suspension realignment and other major design changes mentioned previously, the evolution of the legendary *T-34* was assured.

In early 1940, the first two *T-34* prototypes were tested by the Red Army. Acceptance was quick, as the basic specifications of the sturdy Russian machine reflected its common sense design and ability to perform the basic mission: destruction of the enemy and crew protection. The tank's weight was 28 tons, while the diesel power plant could produce 500 horsepower. The four-man crew was situated in twos; the tank commander/gunner and the loader in the turret; the driver and machinegunner in the front hull space. Protective armor at maximum was 50-mm in this early model, the minimum, 15-mm. The sides and front of the turret and hull had maximum protection, while the hull bottom, rear plates and engine cover grates had the least armor. Speed across moderate terrain was 24 miles per hour and offensive armament consisted of one 76.2-mm rifled cannon and two 7.62-mm machineguns. One machinegun was located in the front hull to the driver's right; the other in the turret, firing on the same plain as the main armament. The *T-34* was designed to run on a variety of fuels, and its wide tracks enabled it to negotiate swampy, muddy ground with more ease than its German counterparts, the Panzer *Mark III* and *Mark IV*.

The vehicle was designed by Russians, for Russia. The terrain, climate and vast distances were taken into account, as was the importance of maintenance and machine operation. In addition, the designers knew the type of individual who would man the *T-34*. This knowledge led the engineers to add no frills or unnecessary comfort features to confuse or distract the peasant-turned-tanker. For these basic reasons, the squat, mass-produced Russian machine became the main outside influence on German armor development from 1941 through the end of the war.

As German General von Mellenthin summed it up:

"...I come now to the (Russian) tank arm, which began the war with the great advantage of possessing the *T-34*, a model far superior to any tank on the German side."

German Armor

The first four *Marks* that were developed by post World War I German industry were graduated in size, armament and original purpose. The *Mark I* was created strictly as a training vehicle, and only production delays of the later, larger models forced the German High Command into using the *Mark I* as a combat machine. The *Mark II* was slightly bigger, better armed, and wore thicker armor. The MBT's, *Marks III* and *IV*, were designed to fight, and overcome, any tank then in existence. The *Mark III* and *Mark IV* did this with comparative ease until the first *T-34*'s were encountered. As General von Mellenthin further stated:

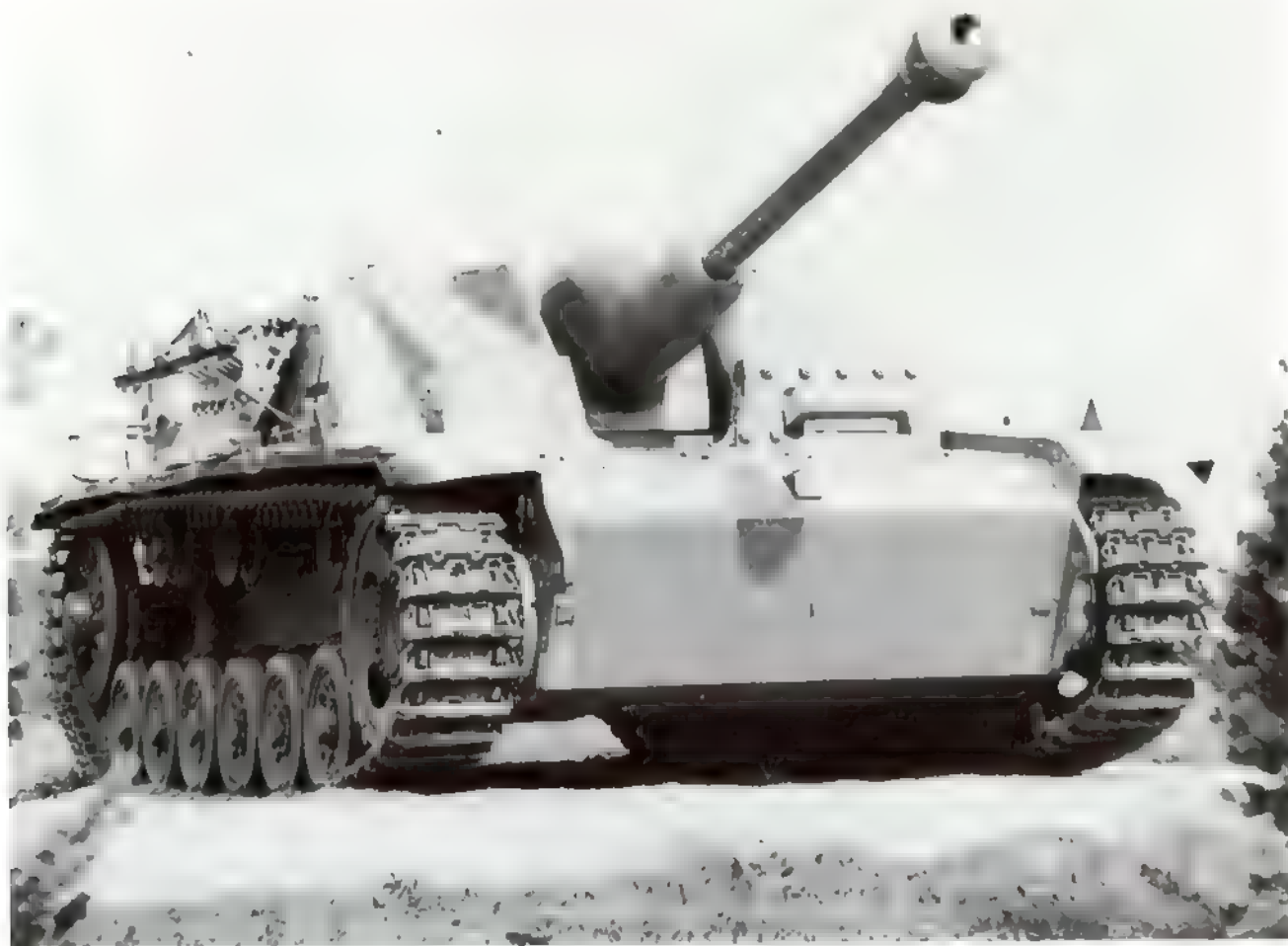
"...A second factor (in the German defeat in Russia) was the high quality of the Russian tanks. In 1941, we had nothing comparable with the *T-34*, with its 50-mm maximum armor, 76.2-mm high velocity gun, and relatively high speed with splendid cross country



King Tiger (Tiger II)

performance. These tanks were not thrown into battle in large numbers until our spearheads were approaching Moscow; they then played a great part in saving the Russian capital. General Guderian has described how numerous *T-34*'s attacked his 24th Panzer Corps near Orel on 11 October 1941 and inflicted heavy losses on the German tanks. Up to that time, German tanks had enjoyed superiority, but from then on the situation was reversed. As a result of Guderian's representations (to the German High Command) measures were taken to speed up the production of our *Mark III* and *Mark IV* *Specials*, and also to strengthen the existing

quickest way of putting to rights the most unhappy situation of the German Panzer Troops; but the designers could not agree to this. This was not primarily because of the designer's natural pride in their own inventions, but rather because it would not be possible to mass-produce essential elements of the *T-34* — in particular the aluminum diesel engine — with the necessary speed. Also, as far as steel alloys went, we were at a disadvantage compared to the Russians, owing to our shortage of raw materials. It was therefore decided that the following solution be adopted: the construction of the *Tiger* tank, a tank of



German Assault Gun

armor of our *Mark III* and *Mark IV* tanks."

In armor, offensive armament, speed and terrain negotiation, the four basic German tanks were made obsolete by the *T-34*. The German Armored Forces were in an uproar:

"...A group of responsible designers, industrialists, and officers of the Army Ordinance Office visited Panzer Army in November 1941, with the object of studying at first hand our recent combat experience when fighting the superior Russian tank, the *T-34*, and of deciding what measures should be taken to help us regain technical supremacy over the Russians. The officers at the front were of the opinion that the *T-34* should simply be copied, since this would be the

some 60 tons, which had recently been started would continue; meanwhile, a light tank, called the *Panther*, weighing between 35 and 45 tons, was to be designed."

Hitler however, had a different reaction to the design of the Russian vehicle.

"...When the Russian *T-34* appeared, Hitler was triumphant, for he could point out that he had earlier demanded the kind of long-barreled gun it had. Even before my appointment as Minister of Armaments, I heard Hitler in the Chancellery garden, after a demonstration of the *Panzer IV*, inveighing against the obstinacy of the Army Ordinance Office which had

turned down his idea for increasing the velocity of the missile by lengthening the barrel. The Ordnance Office had, at the time, presented counterarguments: the long barrel would overload the tank in front, since it was not built with such a gun in view. If so major a change were introduced, the whole design would be thrown out of balance."

The later model *Mark IV's*, *F*, *H*, and *J*, were upgunned by the addition of the long-barrel 75-mm L/43 or L/48. This weapon was the one mentioned by Hitler, but its use on the later model *Panzer IV's* was a direct result of the long barrel 76.2-mm weapon mounted on the *T-34*. This upgunning proved successful, as the *Mark IV* was then in a position to face the *T-34* on more or less equal terms.

As previously mentioned, development of the next generation of German tanks, *Mark V Panther* and *Mark VI Tiger*, was stepped up. With the *T-34* entering into the picture both technically and numerically, the *Panther* and *Tiger* designs became vital to the survival of the German Panzer Force, and indeed of Germany herself.

The *Panther* was classified as a light tank, with the first model, *D*, entering service with armored regiments in July 1943. The *Mark V* had numerous features borrowed from the *T-34*, such as a radically sloped hull and turret armor surface and a long-barrel, improved design 75-mm gun, the 42 L/70.

Table 1. Comparison of Basic Data for Russian T-34, German Panther and Tiger Tanks
(Dimensions expressed in the Metric System)

	Horse								
Vehicle:	Lgth	Width	Hght	Power	Wght	Armor	Crew	Speed	Gun
T-34/76	6.5-m	3-m	2.45-m	500	271ns	50-mm	4 men	46kph	76.2-mm
Panther	6.9-m	3.5-m	3.1-m	700	451ns	80 mm	5 men	46kph	75-mm
Tiger I	6.2-m	3.7-m	2.8-m	700	551ns	100-mm	5 men	37kph	88-mm
Tiger II	7.2-m	3.7-m	3-m	700	701ns	150-mm	5 men	40kph	88-mm

Hitler had envisioned the *Panther* as one of his "Wonder Weapons" and delayed the Kursk Offensive for two vital months in order that *Panthers* could play a key role. This delay was useless as the new, untried machine displayed numerous flaws, such as engine fires, cooling system deficiencies, and transmission failures. These difficulties caused most of the *Mark V's* involved to be destroyed during the course of the battle or lost to mechanical failure prior to it. Before the attack began, General Guderian warned that:

"...The *Panthers*, on which our Chief of the Army General Staff was relying so heavily, were still suffering from many teething troubles inherent in all new equipment."

The *Panthers* that survived Kursk were withdrawn from combat units for correction of their many faults. When the modified machines, classified model *G*, entered combat, it was evident that the vehicle was more than a match for the *T-34/76*. Due to the many problems in production and raw materials supply however, only 5,805 *Panthers* were produced from 1943 through April 1945. During this same period, Russia produced approximately 25,000 *T-34/76's* and *T-34/85's* which, when compared to earlier *T-34* models, had a larger cannon, better crew protection and numerous other combat and engine/drive-train improve-

ments. General Guderian points out that:

"...Hitler's appeal, 'to all those engaged in tank production,' on January 22, 1943, and his delegation of full powers to Minister Speer for increasing such production, indicate the growing anxiety concerning the declining power of the German Armored Forces in relationship to that of the enemy, who was steadily continuing the mass production of his outstanding model, the *T-34*."

The *Mark VI Tiger*, and the larger *Tiger II*, were the biggest and deadliest armored vehicles produced and committed to combat during World War II. Armor thickness was graduated from 100 millimeters to 150 millimeters (4 to 6 inches) on the turret and front plating, which made the machine almost immune to the majority of Allied and Russian antitank weapons. The *Tiger's* 88-mm cannon could penetrate any opposing tank with an armor piercing round at a range of 1,100 yards. The designers had also incorporated many mass production techniques in the *Panther* and *Tiger* which allowed many of the same components to be used by both tanks, thereby eliminating many supply problems. The same type of engine, for example, was used in both the *Panther*, *Tiger I* and *Tiger II*. As with the *Panther*, in the *Tiger* we see a clear reflection of the *T-34's* sloped armor, wide tracks and incredible toughness. These features combine to produce a truly excellent armored vehicle, whose only fault is a poor engine horsepower/vehicle weight ratio. The result of this defect was poor cross country performance compared to the Russian vehicles to be faced.

The German designers knew that the only way to defeat the Russian armored hordes was to learn their secrets and use those secrets to create equal, if not better, tanks. In the *Panther* and *Tiger* variations, I believe this goal was achieved. As General von Senger und Etterlin stated:

"...German engineers found an answer to almost every requirement, feasible or impractical, and produced designs like the *Panther*...to outfight the *T-34*."

In summary, the *T-34* forced Germany to radically change its thinking in armor design and tactics. These changes, while creating a better quality armored force, also caused Germany to fall hopelessly behind the Allies in production quantity and to lose the war. While the *Panther* and *Tiger*, in their final forms, were definitely superior to their Russian counterpart, the *T-34*, in the end it proved to be both model and executioner for the German Panzer Forces during World War II.



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Organize a Mechanized Force

(continued from page 11)

vehicle crews. The march of 1,020 miles through Ohio and along the southern shores of Lakes Erie and Ontario, was completed in 6 days.

The Plattsburg exercises, involving two Corps Headquarters, six Infantry Divisions, the Mechanized Cavalry Brigade, and supporting troops, were the largest peacetime maneuvers ever held by the U.S. Army up to that time. They were well-covered by the press and a host of U.S. and foreign military observers. The German officer contingent was particularly interested in the equipment of the brigade and spent much of their time with it. But the exercises had barely gotten underway when they departed hastily without explanation.

The employment of the 7th Cavalry Brigade (Mecz) during these maneuvers generally followed the recommendations of General Chaffee which were calculated to demonstrate the mobility and striking power of mechanization. In the final exercise, the Mechanized Brigade, after a wide enveloping movement, was poised to strike deep behind the flank of the enemy forces. The town of Peru, a key road center, was the objective. Chaffee with his command group moved to the high ground beyond the brigade assembly area, where the attack could be observed. As the leading wave of combat cars rolled through Peru with little opposition, the general said to his aide: "Message to General Drum: 'I occupy Peru. - Chaffee'." This terminated the maneuvers.

During a scheduled visit by the Mechanized Brigade to the World's Fair we learned why the German observers had left the maneuvers so precipitously. On 1 September 1939, the German *blitzkrieg* was launched against Poland. In 2 weeks, in Poland, the truth of the doctrine that the Mechanized Cavalry had been advocating for 7 years was demonstrated on a grand scale. This was the catalyst that convinced the Congress and the "Doubting Thomases" in the War Department that instead of being an expensive luxury, Mechanized Cavalry was an essential, major component of the Army.

Breaking camp at the World's Fair at 0100 on 8 September, after having loaded all of its tracked vehicles except four diesel-powered *M-1* combat cars for rail shipment, the brigade started its return trip to Fort Knox. Departing from the first night's camp in Pennsylvania, General Chaffee flew to Washington for a conference with a friend, Brigadier General Frank M. Andrews, G-3 of the War Department. Their discussion was based upon the unfolding war in Europe and the anticipation that the United States would eventually be drawn into it. The organization of a Mechanized Cavalry Division, based on lessons of the Plattsburg and previous maneuvers, was considered as was cooperation of combat aviation with mechanized units that was proving so effective in Poland. This led to speculation as to the proportion of Army strength that should be allotted to Mechanized Divisions and to Groups of Combat Aviation in the event of a general mobilization and Chaffee recom-

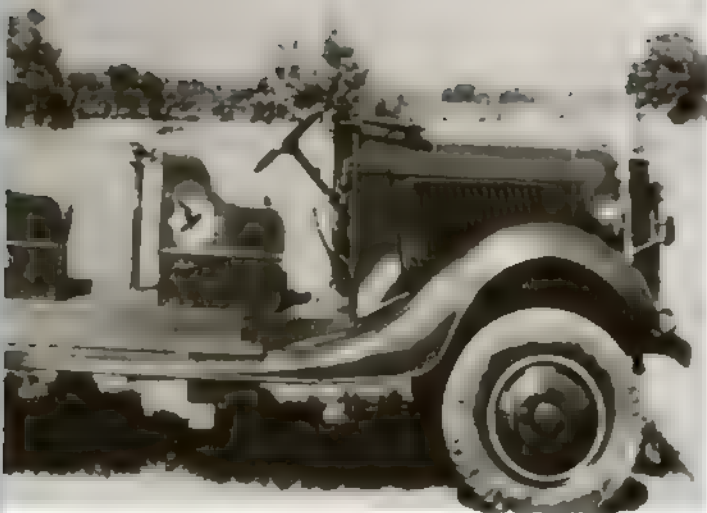


4.2 Chemical Mortar and Carrier

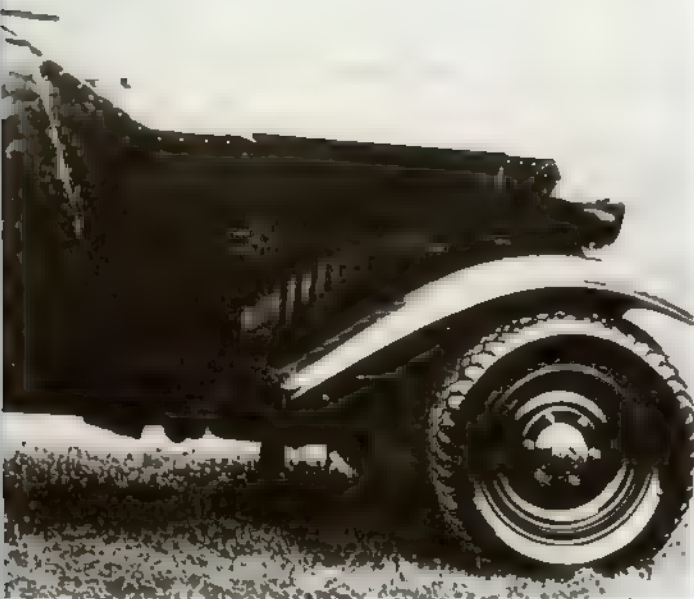


Franklin Armored Car (4x4)





Combat Car M-3 (without weapons)
Note Trailing Idler



LaSalle Armored Car (4x2)

mended that there should be one Mechanized Division in each Field Army.

The last 36 hours of the return trip from New York to Knox, was designated as a forced march. During this period, the Brigade covered a total of 390 miles, bivouaced 1½-hours for refueling, a hot meal, and rest, and spent 5 hours later that day at Jeffersonville, Indiana, unloading and servicing its tracked vehicles and reorganizing the command for the completion of the march to Fort Knox with all vehicles.

Following the Plattsburg maneuvers, General Chaffee was invited to address the Army War College on the subject of Mechanized Cavalry. Quoted from this address are some of his suggestions for improving the organization of the Mechanized Brigade of the day.

"The Brigade, as it exists, is not the largest and most powerful striking force which can be controlled and handled by one command. It can be increased in power and maneuverability without corresponding increase in its trains, if that enlargement is embodied largely in existing units.

"The Brigade is in dire need of its own reconnaissance elements, separate and distinct, over and above that of its regiments. . . It needs additional holding power in the form of additional machinegun and rifle units.

"The need for some riflemen who are securely mounted and are as mobile as other elements of the Brigade has been demonstrated time after time.

"The brigade needs an engineer component. It is not sufficient that these engineers be of the ordinary truck-carried, combat engineer-type. They should have good cross-country traction and they should be provided with special mechanical means, particularly for the quick strengthening of bridges and for the quick placing of obstacles.

"Water supply and purification are needed as well as some quick map making means.

"The Brigade is now authorized a medical troop which will be formed this winter. The special problem of evacuating a force of this character has never been adequately studied, much less practiced.

"The supply of gasoline within such a unit is a matter closely related to command. Certainly its own trains should carry sufficient fuel for a full day's operation, and this must be measured in hours—not miles.

"These matters have all been presented to the War Department within the past year. The soundness of each has, in my opinion, been again demonstrated in the recent maneuvers. While the Chief of Staff disapproved the formation of a Cavalry Division, Mechanized, his decision did not preclude the obtaining of the equipment necessary to remedy the known deficiencies in the present Brigade and I hope they will soon be remedied."

In conclusion, General Chaffee noted that:

"A more powerful and more numerous mobile mechanization should be built up in our Army. In fact, I think it is imperative that we do so without much delay, but I do not believe it absolutely essential that we follow either the German, the French or the British in details of organization.

"To me the basic determination of the War Department to develop the mobile mechanization as Cavalry, with cavalry concepts and leadership, and to develop the immediate tank assistance to Infantry, as Infantry and by the Infantry Tank Service, has been again shown both by the Plattsburg maneuvers and by the German operations in Poland, to be an essentially sound solution under our law and should be continued. I believe the Tank Service to have a continuing and important role in the close support of assault infantry, a role that is separate and distinct in thought, conception, method, and equipment from the role of Mechanized Cavalry and mechanized forces.

"Mechanized Cavalry, or Panzer Corps, do not take the place of properly supported battle infantry which is needed in quantity in any army. What we really should

"The Chief of Cavalry's brusque reply was to the effect that he would accept Armor as part of Cavalry, but he would not sacrifice one horse to create an armored force."

have in a Mechanized Division is the strength in men and materiel comparable to the strength of the German Armored Division but organized along well understood American principles for the decentralization of command. Then we will have to unlearn nothing in the handling of our division."

"I am only too happy to say that the Chief of Cavalry has on the date of this lecture agreed to recommend the organization of such a division along these lines in our Army, and I believe it is thoroughly justified under the present circumstances. It is a minimum of four divisions along these lines and of this strength which we should have with our four Armies."

The buildup of mechanized forces as envisioned by General Chaffee continued during the spring of 1940, when the 7th Cavalry Brigade (Mecz) was augmented by three units. On 1 February, the 47th Engineer Troop (Mecz) was organized under the command of Captain Bruce C. Clarke, Corps of Engineers. Soon after this, the 4th Medical Troop was organized and commanded by Captain L. Holmes Ginn, Medical Corps. These two units were organic to the Brigade. Concurrently, the 6th Infantry Regiment at Jefferson Barracks, Missouri, had been designated to be motorized for the purpose of operating attached to the Mechanized Brigade during the Third Army Maneuvers to be held in Louisiana in May. At Chaffee's request, this unit was moved to Knox on 1 March for premaneuver training with the Brigade. The extent of this training was limited by the fact that the transportation which was to motorize the regiment did not become available until 4 days before its departure with the brigade to the maneuver area. So the motorized training had to be conducted in vehicles that could be spared from the mechanized units during their heavy training schedule.

With the strength of the reinforcement brigade at about 3,500 officers and enlisted men and 1,000 vehicles, the march to the maneuver area was made in two serials traveling over the same route a day apart.

The principal objective of these maneuvers was to test the new *streamlined* organization of the IV Corps made up of three triangular divisions and Corps Troops including the 6th Cavalry, Horse-Mechanized, recently reorganized with one horse squadron, porteed in semitrailers, and one scout car squadron. This Corps was commanded by Major General Otto Krueger with Lieutenant Colonel Dwight D. Eisenhower as Chief of Staff. The opposing force was the IX Corps comprising the 1st Cavalry Division, the 2d Infantry Division, the 4th Cavalry Regiment and other corps troops. Both these divisions were four-regiment or *square* divisions. Attached to the IX Corps throughout the maneuvers was the 7th Cavalry Brigade (Mecz), reinforced by the 6th Infantry Regiment (Motorized).

Provisional Tank Brigade under Brigadier General Bruce Magruder, composed of two light tank regiments, a medium tank battalion and the 29th Infantry Regiment reinforced the IV Corps except in the last exercise when it joined the 7th Brigade in an assault of a prepared position.

Recommendations stemming from lessons learned during these maneuvers would eventually result in the creation of the Armored units we know today. But not until certain obstacles were overcome.

With the termination of the exercises, senior commanders and staff officers converged on Alexandria for the critique which was brief. Immediately afterward, all the General Officers, commanders as well as observers, in the maneuver area, were assembled behind locked doors for a discussion. This imposing group included at least two Army commanders and several Corps commanders. From this meeting, General Chaffee emerged with the mission of presenting the recommendations of the group to the Chief of Staff of the War Department in Washington. These "Alexandria Recommendations," in brief, were for the immediate creation of an Armored Force embracing all Mechanized Cavalry and separate Infantry tank units, and the organization with the least practical delay of four Armored Divisions, one for each Field Army. These were essentially General Chaffee's recommendations to General Andrews, War Department G-3, following the Plattsburg maneuvers of 1939.

Immediately after reaching Fort Knox with the returning 7th Cavalry Brigade, General Chaffee departed for Washington. Before approaching the Chief of Staff with the "Alexandria Recommendations," he went to the Chief of Cavalry, Major General John K. Herr. Since the development of mechanization was officially a function of the Cavalry, Chaffee informed his Chief of these recommendations to create an Armored Force, and suggested that some Cavalry units be converted to form nuclei for the new Armored divisions. General Herr's brusque reply was to the effect that he would accept Armor as part of Cavalry, but he would not sacrifice one horse to create an armored unit. Thus was delayed, until after World War II, the logical merging of Armor and Cavalry. Following this unhappy meeting, General Chaffee presented the "Alexandria Recommendations" to the Chief of Staff.

In spite of some opposition to mechanization, the 7th Cavalry Brigade returned to Fort Knox on 31 May to find

cadres and recruits for a 1,200-man increase awaiting them. On 1 June 1940, the 7th Reconnaissance and Support Squadron was created from this increment under the command of Captain H. H. D. Heiberg. Organized with a reconnaissance troop, a combat car troop, a motorcycle troop and a headquarters detachment, this unit was the independent reconnaissance element of the Brigade commander. Initial equipment included the *M-1 armored cars*, *M-1 combat cars*, and motorcycles—all of which had been recalled from retirement and reconditioned. The Brigade was also augmented at this time by the organization of the 7th Signal Troop (Mecz) under the command of Captain Grant A. Williams.

Then, on 10 July 1940, just 15 days after the fall of France, mechanization in the U.S. Army began in earnest when the War Department issued an "immediate-action" letter creating the Armored Force. Brigadier General Adna R. Chaffee, Jr., was designated to command the Armored Force and the I Armored Corps at Fort Knox, with the broad mission of developing tactical and training doctrines for all units of the Armored Force. He was also tasked with the research and advisory functions pertaining to the development and procurement of all special transportation, armament, and equipment used primarily by armored units. As of 15 July 1940, Armored Force consisted of Headquarters and Headquarters Company, I Armored Corps and 1st Armored Division at Fort Knox, Kentucky; 2d Armored Division at Fort Benning, Georgia; 70th Tank Battalion, Medium, at Fort George G. Meade, Maryland (assigned to GHQ Reserve). These units were directed to be prepared for active operations on and after 1 October 1940, with such equipment as was on hand.

The 1st Armored Division, Brigadier General Bruce Magruder commanding, was organized from the 7th Cavalry Brigade as a nucleus. The 3d Battalion, 67th Tank Regiment, Medium, was transferred from Fort Benning to Fort Knox to organize the 69th Armored Regiment, Medium, of the division and the 6th Infantry at Jefferson Barracks, Missouri was redesignated the 6th Infantry, Armored, and assigned to the division and transferred to Fort Knox, less personnel and equipment of the 3d Battalion which went to Fort Benning.

The 2d Armored Division, commanded by Brigadier General C. L. Scott, was organized from the infantry tank units of the 7th Mechanized Brigade as a nucleus. They also

received a cadre from the 1st Armored Division, including some personnel and armored cars from the 1st Reconnaissance Battalion, two firing batteries of the 68th Field Artillery and, later the 3d Battalion, 6th Infantry.

On 19 September 1940, the Secretary of War authorized the formation of the Armored Board, the Armored Force School and the Armored Force Replacement Center, all with station at Fort Knox.

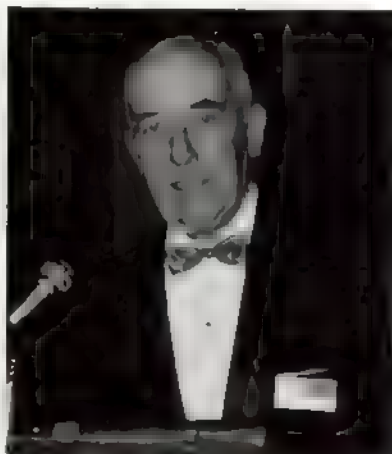
Thoroughly aroused by the worsening situation of the war in Europe, Congress had loosened the purse strings on military expenditure. The procurement of armored equipment was expedited and a \$4,200,000 model cantonment was built for the 2d Armored Division at Fort Benning, while new cantonment construction sprang up all over Fort Knox. The unit recruiting program that had proven so successful in the 7th Mechanized Brigade, was instituted throughout the Armored Force to bring in young men who were attracted by the new type of warfare that was proving so successful in Europe.

On 13 January 1941, the War Department ordered the organization of the 3d Armored Division at Camp Polk, Louisiana and the 4th Armored Division at Pine Camp, New York. Cantonments, patterned after that of the 2d Armored at Benning, were started at those two stations and on 21 February 1941, the 1st and 2d Armored Divisions were each directed to furnish cadres of 3,750 men, including 1,553 specialists; the cadre of the 1st to form the 4th Armored Division and that of the 2d to form the 3d Armored Division. Both these new divisions were activated on 15 April 1941. On 3 April 1941, the War Department ordered the activation of the Armored Force Headquarters and Headquarters Company at Fort Knox, separate from the I Armored Corps.

In less than a year, the "Alexandria Recommendations" had been put into effect.

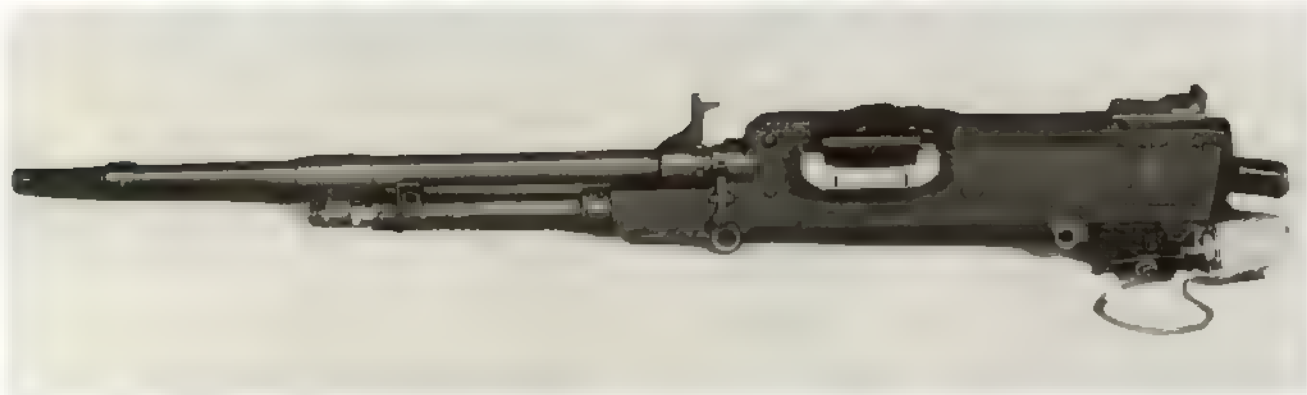
General Chaffee did not live to see the entry of the United States into World War II and the four-fold increase of the Armored Force, nor did he live to see his doctrines for the employment of mobile mechanization proven in combat. Adna Chaffee died on 22 August 1941 in command of the Armored Force that had achieved his long standing goal of four armored divisions, one for each field army.

He had accomplished his mission: "*Organize a Mechanized Force.*"



COL H.H.D. HEIBERG was commissioned in Cavalry upon graduation from the United States Military Academy in 1919. A C&GSC graduate, he served with the 8th, 1st, and 10th Cavalry Regiments and instructed Cavalry ROTC at the Virginia Military Institute and mathematics at the U.S.M.A. from 1920-31. From January 1932 through August 1936, he served with the Detachment for Mechanized Cavalry Regiment and the 1st Cavalry (Mecz) at Camp Knox, Kentucky. An ADC to Brigadier General Adna R. Chaffee at Fort Knox in 1939, he organized the 7th Reconnaissance and Support Squadron of the Brigade (later the 81st Reconnaissance Battalion, 1st Armored Division) a year later. In 1942, Colonel Heiberg served as G-3, III Armored Corps, and a year later, as Chief, Plans Branch, G-3 Section, 1st U.S. Army Group in London. Assigned to OPD in 1945, he was reassigned as Chief, Armored Vehicles Branch, Development Section, Army Ground Forces where the former office was phased out. In 1946, he was transferred to Panama as a Chief of Staff, Plans, Caribbean Defense Command, and in 1948, became Chief of Staff, Caribbean Command. He served as President, Army Field Forces Board No. 2, Fort Knox in 1948-51; Deputy Chief R & D, OCAFF, Fort Monroe, Virginia in 1951-53, and Deputy and CO, Southern Area Command, Munich, Germany in 1953-54. Colonel Heiberg retired upon returning to Fort Knox.

MAG-58: The New Coax



by Lieutenant Colonel Robert W. DeMont

The new coaxially mounted machinegun for U.S. tanks is here. Designated the *MAG-58* (Mitrailleuse A-Gas), the coax is made in Belgium by Fabrique Nationale (FN) and should be available to the U.S. Army in January-February 1977. Sufficient weapons to replace all *M-219*'s and *M-73*'s will be delivered within 2 years.

The *M-219* and its predecessors that were of the 7.62-mm vintage never have functioned very well in the coax position. Continuous, but unsuccessful, efforts were made to improve the weapon's deficiencies. It took the Mideast War to "rally the tankers around the flag pole," and decide that a replacement coax was required *immediately*.

Following that decision, here is what happened. The Commander, Armor Center requested that the *M-219* production be stopped and on 16 May 1975, Headquarters, Department of the Army agreed. Earlier, a Joint Planning Group consisting of Commander, ARMCOM; Commander, Armor Center; Project Managers of *MICV*, *M-60*, and *XM-1* was formed on 23 July 1974 and met on 8 October 1974 to examine all existing machineguns that could possibly satisfy the roles and missions of the coax. Foreign contenders were included. Key points to remember are that the *M-219* production was stopped; the gun to be chosen had to be immediately available, and the production facilities had to be capable of providing guns by December 1976-January 1977 in order to prevent *M-60* tanks from coming off the accelerate production lines without coaxes.

Because of cost and time constraints, the contenders had to be narrowed down. It was decided that the Armor and Engineer Board at Fort Knox would test three *M-219*'s, product-improved *M-219*'s, and modified *M-60* infantry machineguns (*M-60 Mod*), while Rodman Laboratories at Rock Island, under control of ARMCOM, would test the foreign contenders.

The test at Fort Knox from October 1974 to February 1975 revealed that the *M-60 Mod* was extremely reliable. In fact, in mean rounds between failure (MRBF—a stoppage requiring more than 60 seconds to correct), it was 1.4:1 better than the *M-219*, and in mean rounds between stoppages, it was 3.9:1 better than the *M-219*. The *M-219 PI* was a real loser.

Based upon these results, the Armor Center asked for an

improved *M-60 Mod* which would correct some of the discovered deficiencies. Rodman Laboratories and Maremont, the producer of the government-owned *M-60*, each modified a gun and sent it to Fort Knox for a check test, which was conducted in April 1975. The check test provided data which permitted a configuration meeting on 7-9 May 1975 to decide what parts should be incorporated in the new *M-60 Mod* (*M-60E2*) for use as Developmental Test (DT)/Operational Test (OT) III test weapon. The Department of the Army staff was briefed on the OT/DT II test results on 28 March 1975, along with the test results of the foreign weapons. The outstanding performance of the *MAG-58* during this latter test caught the attention of the DA staff. Rodman Laboratories achieved 30,000 MRBS and 3,000-3,750 MRBF with the *MAG-58* under controlled conditions, using a handmade gun. The *MAG-58* could not be denied, especially when we were looking for the best gun.

On 2-3 June, an In-Process Review was held at which it was recommended that the *M-60E2* be accepted as the interim machinegun to replace the *M-219*, and that the *M-60E2* be type classified for limited production to provide sufficient weapons for purchase by the U.S. Marine Corps and for use during the Army DT/OT III test. On 17 June 1975, it was directed that a side by side test of the *MAG-58* and *M-60E2* would be conducted.

In order to insure that the test was unbiased, the Assistant Secretary of the Army for Research and Development (R&D) directed the Operational Test and Evaluation Agency (OTEA) to conduct the operational test and independent evaluation of five guns. The Army Materiel Systems Analysis Agency (AMSAA) was also to conduct an independent evaluation of a developmental test of the five guns through the Test and Evaluation Command (TECOM). During the DT/OT 50,000 rounds would be fired by each gun and weapon reliability would be calculated. Because of Congressional interest, GAO was tasked to oversee the test and gun evaluation process. This small-scale test was probably the most closely supervised and monitored test by high ranking military, civilian, and congressional personnel that the Army has ever experienced with a program of such relatively small dollar outlay for procurement of equipment.

It was felt that both guns would easily fire the required

service life of 50,000 rounds and differentiation between the guns would be minimal. In order to insure that the decision makers at DA would have as much information available to them as possible, DA directed TRADOC to conduct a cost and operational effectiveness analysis (COEA). This assignment was further delegated to the Armor Center. OTEA was asked to conduct Phase II, which was called the Durability Phase, during which five guns of each type would be fired until 100,000 rounds or destruction was reached in each gun. The Army's durability data banks are void concerning life of machineguns. What determines when service life has been reached is also a question only partially answered. At the conclusion of the Reliability Phase (first 50,000 rounds) of the test, the *MAG-58* was clearly superior to the *M-60E2*. In reliability, the number one priority performance area, the *MAG-58* was about four times better than the *M-60E2* and 15 times better than the *M-219* in MRBS. Because the *M-219* had been tested under different test conditions and in a different environment, it is difficult to compare with *M-60E2* and *MAG-58*, but the indication is still valid.

In MRBF, the *MAG-58* was about 3-4 times better than *M-60E2* and 5 times better than the *M-219*.

Only certain lot numbers of ammunition can be fired with the *M-219*. During OT and DT of the *MAG-58* and *M-60E2*, five different NATO types of ammunition were fired. These included U.S., German, Canadian, British, and Belgium. Neither the *M-60E2* nor *MAG-58* was ammunition sensitive. The *MAG-58* has a cyclic rate of 780 shots per minute (s.p.m.), while the *M-60E2* rate of 570 s.p.m. Because of the higher rate of fire, many personnel were concerned that the *MAG-58* would use up the tank basic load of 7.62-mm ammunition quicker. A counter to this argument is that during the operational test, the soldier gunners were able to fire controlled bursts of about 20 rounds; given 100 rounds for both guns, the gunners were able to achieve the same area coverage with the *MAG-58* as with the *M-60E2*; furthermore, the tank can carry 6,000-10,000 rounds of 7.62-mm, an almost unlimited amount for all practical purposes.

In the OT, the testers of C Company, 1-70 Armor and D Company, 704th Maintenance Battalion, 4th Infantry Division evaluated the two weapons in 51 categories. The *MAG-58* was favored in 34 categories, while the *M-60E2* was favored in 7. There was no preference in 10 categories. The *MAG-58* was preferred for mounting, adjusting, loading, firing and other handling characteristics, and crew-level maintenance functions. The *M-60E2* was better in ease of cleaning, seeing and setting the safety, and for apparent noise level.

Both weapons were approximately equal in accuracy out to 900 meters. In DT, the *MAG-58* showed its superiority in operation during tests under adverse conditions involving exposure to sand, dust, fog, and saltwater. The friction between parts caused by environmental elements can be overcome by the *MAG-58*, due to its three adjustable gas port openings. As the *MAG-58* becomes sluggish or operation in a difficult environment is expected, the gas port opening is adjusted to the next higher number. The barrel life for both guns in an operational environment are about equal (16-20,000 rounds). Should a heavy firing schedule be required, the heavier barrel of the *M-60E2* is better. The last line of the DT/OT evaluations is that the *MAG-58* is the most

effective weapon based upon test performance.

The COEA examined the life-cycle cost and effectiveness of the weapons portrayed in the 90-day European War scenario. The model used to depict effectiveness of the candidate was designed to accentuate the Reliability, Availability, Maintainability (RAM) characteristics of the weapons. Because the candidates were of equal caliber, accuracy and lethality (all 7.62-mm), the effectiveness of the candidates would have been the same except for RAM and the difference in rate of fire. When evaluating the cost of investment and research and development alone, the *M-60E2* was the preferred candidate. When looking at the relative

"...looking at the relative worth of the candidates over the 15-year life cycle, the MAG-58 was the better solution."

worth of the candidates over the 15-year life cycle, the *MAG-58* was the better solution. This occurred because of the better reliability of the *MAG-58* and less maintenance cost over time and its ability to be more effective when firing at targets encountered in the projected European Scenarios. The COEA also considered the operational issues discovered during DT and OT. A quantitative study is of little value unless qualitative or military judgement of the user community is used to bring the quantitative nature of a study into perspective. The decision would have been rather smooth except for an incident that occurred during the Phase II portion of the test. At about the 69,000 round mark, the *MAG-58*'s developed a small crack in their receivers near the ear that has a rivet which secures the channels that the bolt rides on. According to the definition agreed to by OTEA, AMSAA, and ARMCOM, the small crack was sufficient to cause the *MAG-58*'s durability life to be defined at the round count where the small crack was noted. The problem was that OTEA did not know if this ear would crack all the way through and possibly endanger the lives of the crewmen, or if it would cause the weapon to stop operating. Three of the guns were sent to TECOM for continuation of firing, while one other was to be fired by Rodman Laboratories. After completion of firing, the average life of the four guns was established at 94,000 rounds. Two of the four guns reached 100,000 rounds while the others reached 86,000 and 92,000 before ceasing to operate. Fabrique Nationale had a Belgium authorized test facility test a *MAG-58* receiver having a one millimeter thicker receiver sidewall for 100,000 rounds. No cracks in the receiver occurred. This is the same receiver being used by the Swedish Army. The five *M-60E2*'s on the other hand, fired 100,000

rounds each, but the parts usage was very high. The receiver of the *M-60E2* is very well designed, but the parts usage within 60,000 to 80,000 round interval was about double and remained high until the 100,000 round mark. The debate within the decision maker and reviewer circles centered around the question of what was the life of the average coax? The resolution of this question would determine whether or not the *MAG-58* could meet the user's needs. An analysis of coax machinegun firing by U.S. Army divisions in Europe and the U.S., training bases, reserve units, and a study of current tables of allowances revealed that about 4,500 rounds per year per gun are expended. This computes to a 15-year life of 67,500 rounds. A comparison of the *MAG-58* with *M-60E2* shows both guns meet this prerequisite. Therefore, the final recommendation by TRADOC and ARMCOM to DA was that the Army deploy the *MAG-58* as the new coax machinegun.

On 29 March 1976, HQ DA announced their decision to select the *MAG-58* coaxial machinegun to replace the *M-219* weapon. The decision was made on the basis of providing the U.S. soldier with the most effective weapon available.

Unless Congress does not appropriate the money, tankers

can look forward to receiving the *MAG-58*'s by February 1977. Security, protection and performance—that's what the *MAG-58* coax machinegun means to Armor. Whether you are firing Table VII or have an enemy in sight, "trigger the coax with confidence"! The *MAG-58* will do the job.



LTC ROBERT W. DEMONT was commissioned in Armor upon graduation from the United States Military Academy in 1959. A graduate of C&GSC, he served as troop commander in the 1/2 ACR, tank company commander in the 1/69 Armor, as S-3 of 3/11 ACR, a base camp commander and Armor advisor in Vietnam. Former Chief, Tank Systems Branch, Combat Developments, USAARMC, Colonel DeMont is presently the commander of the 15th Bn, 4th Training Bde, Fort Knox.

ARMOR GRADUATES, CLASS OF 1976 UNITED STATES MILITARY ACADEMY



1st Row: KEENE, SOELDER, ALLEN, APT, FONG, CHAPPO, McGHEE, SCOTT, HYDE, HAWKINS, RAPKOCH, COMPTON, SWISHER, GOLSON, MATEY, GUILLERMO, TOPETE.

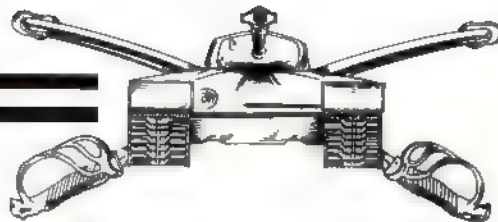
2nd Row: LIUZZO, BROWN, YATTO, SHATZEN, KORZYM, McSWEEN, HERNDON, BEGEMAN, DIEHL, KOFFINKE, KOCHER, TATU, AMICO, DAVIS, CROSBY, HAMILTON.

3rd Row: BURKE, KIMSEY, GERST, SNIPES, WISDA, DECKER, JOHNSON, GEHRKI, BARTLEY, DANIELS, BALINT, CHRISTENSEN, PLUMMER, OCKRASSA, MIGAKI, ANASTAS.

4th Row: MORGAN, SHELLUM, STEFAN, MINEZ, MOWATT-LARSEN, McMANUS, NAUGHTON, LOUIS, GROH, DORNEY, BARATTA, CHUBON, DIXON, MARSHALL, MAINWARING, LANDWERMEYER.

5th Row: ASADA, GRUNWALD, BOOTH, CARLTON, RYBAK, PATTERSON, STEPHENSON, ELAM, DENNY, THOMAS, CANNON, MORGAN, DIETRICH, OLSEN, LOBERT.

Not Pictured: BALLIET, BERRY, BROWN, CHAMBLESS, CROWN, DONAHOD, FERRARI, FRITZ, GLOVER, HOULE, JERAULD, JETTE, KASUN, KELLEY, KITTS, KNOWLES, KOVACH, LACHNER, LAMBETH, LEWIS, MacGREGOR, MAURO, MEADOWS, MIDGLEY, MILLS, MURPHY, NICKERSON, REES, ROLLINS, SCHUETT, SINCLAIR, SMITH, SPEARS, STONE, SWAN, WALKER, WHITE, YOUNGBERG, ZOPHY.



OFFICER SELECTION BOARDS

Each year thousands of officers ask themselves, "Why wasn't I selected?" Some officers can answer their own questions because they knew they were not competitive. Most, having had no basis to evaluate their chances, are completely surprised. Faced with shattered expectations, loss of ego, and frequently family hardship, the normal reaction is to want to do something. Some publicly or privately attack the selection system, and those charged with operating it, as biased and unfair. Others attempt to find out why they were not selected by writing the President, a member of Congress, high level officials in the Department of Defense, or their Career Division of the Officer Personnel Management Directorate, Military Personnel Center.

Frequently, the officer becomes increasingly frustrated because he does not understand the selection system or know what questions to ask. Because of the critical impact of promotion or nonselection on each officer's life, it is essential to understand "why." The answer requires a detailed understanding of:

- How the selection system works.
- Factors which may cause an individual's nonselection.
- Who and what should you ask? What will you be told?

The Selection System

The purpose of the Officer Promotion System is to insure that the Army's best qualified officers advance to the next higher grade. While it is generally understood that selection for promotion is based on an officer's demonstrated ability and future potential, little has been written about the methods used to determine who among the group of officers eligible for promotion should progress to the next higher grade. These deliberations are delegated to duly constituted Department of the Army promotion boards, whose members are guided by a formal Letter of Instruction (LOI) which provides broad guidance and policy considerations and which is supplemented by briefings.

Prior to beginning their deliberations, promotion board members are briefed as a group by a general officer from the Office of the Deputy Chief of Staff for Personnel. He amplifies the salient features of the LOI and gives the board members an opportunity to ask questions. A subsequent briefing by an officer assigned to the Secretariat for Department of the Army (DA) Selection Boards consists of an analysis of the composition of the zone, an explanation of the selection rate, and some practical administrative and procedural suggestions. Additionally, the information briefings are given by MILPERCEN on the Officer Personnel Management System (OPMS) and the Officer Evaluation Reporting System (OERS).

General Information

The names of the officers in the zone of consideration are submitted to the Secretariat on alphabetized rosters. Thus, the officer's record, not his date of rank, determines his relative chances for selection.

Contrary to popular belief, boards normally do not review the entire record of an officer being considered for promotion. While the entire Official Military Personnel File (OMPF) is available, only the efficiency portion, which contains all OERs, commendations, letters of appreciation, the official photograph, and any record of disciplinary actions—along with a copy of the Officer Record Brief (ORB), is reviewed fully. The ORB is printed out from the DA Officer Master Tape File and attached to the OMPF. The remainder of the officer's OMPF containing routine orders and medical history records is reviewed only in individual cases.

The Three-Panel System

Officer promotion boards are currently organized into three panels of three to five members each (depending on the size of the board) and a recorder. Each panel meets independently and recommends selections from among the eligibles. The president sits as a member of one panel to preserve the independence of panel deliberations. The recorders *do not* participate in panel voting. The separate panels are later merged as one board to analyze the results of the independent panel selections and to make the final selections. The analysis establishes three groupings of names:

- Those officers selected by all three panels.
- Those officers nonselected by all three panels.
- Those officers selected by one or two panels.

From these data, the combined board reconsiders and revotes on the files of those officers who were not unanimously voted in or out during the independent panel deliberations. The board then selects from this group those who, in its judgement, are the best qualified to perform the duties and exercise the responsibilities of the next higher grade. The names of these officers are then advanced to fill the remaining promotion quotas.

Designed for use only in conjunction with promotion boards for captain through colonel, RA; and captain through brigadier general, AUS, this three-panel system was formally approved by the Secretary of the Army for use during the 1975 brigadier general, AUS, board. It has been used for each succeeding officer promotion board except those convened for the Army Medical Department (AMEDD).

Conclusions About Boards

Four general conclusions can be made about the operation of selection boards:

- Boards are structured and administered to give fair and equal consideration to each officer under consideration.
- Only officers whose records and reputations reflect honesty, moral courage and maturity are appointed to boards. They perform their duties with integrity and make their decisions based on the guidance they receive.
- Their decisions are based upon comparative excellence, within the limitations of the total numbers of files they can select.
- Their decisions are subjective in that they reflect the total career experience and judgement of each member.

Factors Influencing Selection

A major factor contributing to increased numbers of non-selection is the declining strength of the Army. This decline in requirements is necessarily reflected in selection rates as shown below:

Temporary Promotion Selection Rates—APL

	First Time Considered						
	1969	1970	1971	1972	1973	1974	1975
COL	63.3%	47.8%	48.3%	30.7%	37.3%	39.2%	—
LTC	91.4%	—	77.4%	67.3%	—	68.0%	65.2%
MAJ	79.0%	—	—	—	—	58.8%	59.7%
CPT	—	—	—	—	98.4%	93.7%	—
CW4	72.9%	71.4%	69.4%	51.5%	—	59.3%	51.1%
CW3	85.1%	70.6%	75.5%	69.8%	—	53.3%	60.7%
	Previously Considered						
	1969	1970	1971	1972	1973	1974	1975
COL	3.5%	4.6%	2.3%	4.1%	5.8%	5.5%	—
LTC	9.6%	—	2.8%	7.0%	—	10.3%	5.3%
MAJ	28.5%	—	—	—	—	17.3%	19.3%
CPT	—	—	—	—	66.7%	50.0%	—
CW4	0%	0%	20.4%	27.0%	—	23.2%	13.9%
CW3	10.5%	6.5%	22.8%	20.5%	—	17.1%	16.6%

While statistics may soothe an officer's ego, it does not answer the more specific question of "Why wasn't I selected?" Frequently, officers are dismayed to learn that the answer cannot be given with anything near the certitude he expected.

The deliberations of selection boards are considered privileged, and records are not divulged. The process by which officers are selected for promotion is difficult, sensitive and important. It is a process that deserves special protection against any weakening of the system which is designed to be impartial.

Your career division in the Officer Personnel Management Directorate, MILPERCEN, can make a *subjective* evaluation of your Career Management Individual File (CMIF), and, based on their experience, can advise you as to your strong and weak areas and provide an evaluation of your chances on future boards. Your career division is the best source of information and counsel available to you.

Who and What Should I Ask? What Will I Be Told?

On 19 May 1975, the Officer Personnel Management Directorate reorganized to better support the Officer Personnel Management System (OPMS). Your career division is the best source of information to advise you about your career, including your chances for promotion.

When you call or write your career division, your CMIF will be reviewed and the action officer will tell you what he believes (in his subjective opinion) your particular situation is. If you are a nonselectee, he will tell you why he *thinks* you were not selected and what he feels you should consider doing to strengthen your file before the next consideration. If you want to know your chances on a future board, the action officer will evaluate your file and give you his evaluation. It is critical, however, that you remember that his standard is what has happened on recent boards—he has no advance knowledge of who will be on a future board or what their decisions will be. Your career division is not in the selection business—Career Divisions are in the interpretation business.

Reminders

The key to selection for promotions is to do an outstanding job in whatever job you are assigned to do in the Army. Demonstrated performance is the prerequisite for selection to jobs of increasing responsibility and for both civilian and military schooling. The schooling and jobs, in turn, contribute to your growth and potential. If you are not selected for schooling, attend during off-duty hours or by correspondence; but be sure it doesn't adversely affect your job performance.

Check your official file and make sure you are getting credit for all that you have contributed to the Army and are not absorbing the impact of documents which don't belong in your file.

Trust your career division. Go to your career division first and ask them where you stand and what efforts you should be making to improve your situation. Your assignment officer, professional development officer, and personnel actions officer have as their primary mission the managing of your career.

THE GUARD'S PLAN

The Army National Guard plans to change its officer personnel management system (OPMS) giving Guard officers a better picture of their professional development and education. State Adjutants General soon will get the official word to start implementing OPMS.

The Guard OPMS version generally parallels the active Army dual track system of primary and alternate specialties. However, it will be flexible to meet the unique needs and situation of each state.

Guard officials say states will develop their own management plants. Each guard personnel manager will be tasked with replacing officer MOS with specialty skill identifiers (SSI). Additional skill identifiers (ASI) and language identification codes (LIC) also may be awarded when appropriate.

The specialties may be awarded only after review of the officer's qualifications, including military experience, civilian jobs and education. However, Guard officials note there is less chance for an ARNG officer to get an alternate specialty because of unit designations and geographic limitations. The TOE/TDA of many Guard units have a limited number of scope and specialty assignments. In addition,

units having available specialty slots sometimes are too far from the officer's present unit to expect him to commute each training period.

On the other hand, some officers may develop three to four specialties, but this would be mostly because of DA-directed unit reorganization.

Screening, award of specialties commensurate with duty assignment, and entry on all officer qualification records are to be completed by 31 Dec 1976

OPMS will also affect Guard officer education system. Plans call for:

- Professional military subjects needed by all lieutenants to be taught during pre-commission training. Each officer will be tested at the basic course to measure his knowledge in this area.

- Establishment of a command refresher course for O-6 and O-5 picked for battalion and higher command slots.

- Restoration of the resident associate advanced course.

- Expansion of the nonresident instruction to play a larger role in the officer education system.

- Elimination of the senior commanders orientation and senior officers preventive logistics courses.

National Guard Bureau officials encourage appointment of state OPMS managers to research and develop plans for conversion to the new management plan.

State Adjutants should watch for OPMS letter 2-76, subject: ARNG (OPMS). The letter which outlines OPMS implementation plans should be mailed soon.

AFN Release 20-10

EPMD

Infantry/Armor Career Branch maintains branch files or Career Management Individual Files (CMIF) on all CMF 11 personnel in grades E6 through E8 in addition to all personnel in the special categories listed below:

Special Forces personnel

Personnel assigned to Ranger Battalions

Drill sergeant personnel

Personnel selected for DA Involuntary Retraining/Reclassification Program.

Branch CMIFs may be reviewed as well as the Official Military Personnel File (OMPF). Appointments may be made to review the OMPF by calling Autovon 221-9618 approximately one week prior to your visit. Documents contained in the CMIF include:

Official Photographs (AR 630-40)

Enlisted Efficiency Reports (DA Form 2166-4)

Enlisted Evaluation Data Report (USAEEC Form 10)

Service School Academic Evaluation Report (DA Form 1059)

Civilian Institution Academic Evaluation Report (DA Form 1059)

College Transcripts

Correspondence Course Completion Documents

Record of proceedings under Article 15, UCMJ (DA Form 2627)

Letter Efficiency Reports

Personnel Qualification Record (DA Form 2 & 2-1)

Enlisted Qualification Record (DA Form 20)

Bar to reenlistment

Copy of "Statement of Option" in accordance with QMP bar to reenlistment

Appeal denial to bar to reenlistment

Enlisted Preference Statement (DA Form 2635)

Separation Orders

Retirement Application (DA Form 2339)

Assignment instructions/messages

Reclassification Orders

Volunteer Applications

Request for Schools

Copies of correspondence, official requests from service member

Promotion Orders

The following Documents are not maintained in the CMIF (but are maintained in the OMPF)

Letters of Commendation and Appreciation

General Orders announcing awards and award citations

Certificate of Achievement

When forwarding documents for filing in your CMIF, send them to MILPERCEN, ATTN: DAPC-EPK-1, 2461 Eisenhower Avenue, Alexandria, VA, 22331. If you include a self-addressed DA 209 card, we will acknowledge receipt of your correspondence.

DA FORM 2 and DA FORM 2-1

Service members should take special care when reviewing DA Forms 2 and 2-1 as they are used by assignment managers in making assignment decisions along with the *Enlisted Preference Statement* (DA Form 2635). Particular attention should be devoted to ASI and SQI entries to insure they are complete and accurate.

ADDITION TO MOS 11E

Personnel formerly in MOS 12F, Combat Engineer Tracked Vehicle Crewman, were reclassified into MOS 11E effective 1 September 1976. Future Skill Qualification Tests will include areas of interest concerning the Combat Engineer Vehicle (CEV) and Armored Vehicle Launched Bridge (AVLB). Armor personnel will now be assigned to Engineer units with CEV and AVLB equipment.

TIME BETWEEN OVERSEAS ASSIGNMENTS

Personnel returning from overseas normally remain in CONUS 12 months before becoming eligible for another overseas assignment. The specific periods two individuals of the same grade and MOS remain in CONUS is a factor of the duty position each is assigned and priority overseas assignment requirements. Selected CONUS duty positions have approved stabilization periods IAW AR 614-5. Infantry/Armor Branch Career Advisors and Assignment Managers do consider total CONUS and overseas duty, but requirements and priorities often dictate the ultimate assignment.

VIETNAM PHOTOS NEEDED

The Center of Military History is preparing a pictorial volume in the Army's official history of the Vietnam War and would welcome photographs illustrating the following subjects: Viet Cong and North Vietnamese Army activities, morale and discipline in USARV, Vietnamese life in the cities and on the outskirts of U.S. bases, battle damage, and combat. All contributions—prints only, no slides—should be sent to:

Dr. Joel Meyerson
U.S. Army Center of Military History
Forrestal Building, Washington, D.C. 20314
(202) 693-5375; (Autovon) 223-3575



FOURTH STAR TO ARMOR OFFICER

Lieutenant General William A. Knowlton, has been promoted by President Gerald Ford to the rank of General and assigned as Commander, Allied Land Forces South-East Europe. He joins General Haig to become the second Armor Officer presently wearing four stars.

General Knowlton has been a member of the U.S. Armor Association and its Cavalry predecessor for many years and has served on the Executive Council.

More On Leadership Award

Contract negotiations, and inflationary and quality control problems have caused a 9-month delay in the Armor School's capability to deliver the Armor Leadership Award (Draper Award) to requesting units. An announcement in a later issue of ARMOR will give a date for submitting future orders for the award.

GENERAL WEYAND ADDRESSES ABRAM'S CHAPTER

The U.S. Armor Association's Secretary, Lieutenant Colonel Burton S. Boudinot, presented the Charter and Association Plaque for the Creighton W. Abrams Chapter of Washington, D.C., to Lieutenant General (Retired) Don Cowles, chapter president, at a luncheon held 15 July at the Fort Myer Officers Club.

The highlight of the luncheon was an address by the Army Chief of Staff, General Fred C. Weyand. The following are excerpts of his speech.

"I'm delighted with the fact that you have chosen General Creighton Abrams as the name for your chapter...

"One of his (Abe's) standards was a great belief in professionalism and dedication to it. I urge you to respect that and the faith he had that it's the people that make up this Army, and that they are the true vital part of the Army..."

Abe taught me a lot of things and there are two of them... that I put at the top of the list. One had to do with the importance he attached to personal leadership and the other had to do with teamwork... He used to say that soldiers are not *in* the Army, they *are* the Army. He believed that very deeply. So his style of leadership, that has made him the legend that he is, reflects that... He also believed, as I think all of us do, that the Army is not a business, it's not a place of work—it's a way of life..."

"I was reading the just-published version of FM 100-5, our basic operations field manual... which marks a very significant departure from the way that the Army has done business on the field of battle in the past. There is this statement and they have it highlighted. It says that, 'The tank with its cross-country mobility and its formidable firepower has been and is likely to remain the single most important weapon in fighting the land battle.' ... I believe every word of that."

"I was looking at the charter of this chapter last night which... encompasses the disseminating of information on military arts and sciences with, of course, particular emphasis on ground warfare and mobility. It also talks about the need to promote professional improvement in the Armor Community. That's very important."

On the subject of teamwork, General Weyand stated: "We're taking this seriously in the Army, this need for teamwork... We are building teamwork into the combat arms, into our training, our doctrine for combat, building it into the active forces and the reserves through these affiliations and round-out programs... We recognize... the corporate leadership of the Army recognizes that Armor is the vital part of that Army team..."

Attending the luncheon were officers from numerous agencies of the Department of the Army, including over 25 general officers, active and retired.

WE CAN'T ALL BE HEROES: A History of the Separate Infantry Regiments in World War II. by Melvin Curtis Walthall. Exposition Press. 159 pages. 1975. \$7.50.

WE CAN'T ALL BE HEROES is a brief glimpse of the separate infantry regiments of World War II. Much has been written on divisions and their subordinate units, and understandably, what honors and glories they achieved in their endeavors. This is not the case for separate units, no matter what size they happen to be. The student of military history may dispute this to some degree—yet the reader who has served in this type unit will know how little publicity they normally received because the types of missions they performed were not news worthy.

Sometimes witty—sometimes dry—*WE CAN'T ALL BE HEROES* leads the reader through a host of regiments born, bred, utilized, and then discarded during the turmoil which was created in the course of a global scale war. To the young professional who is not familiar with domestic preparations and safeguards employed in the defense of the Continental United States, and the major reorganization from the old square divisions to the triangular concept, the book is a useful study. It is also a study in the complex operational network utilized by a nation to safeguard its borders. Finally, it is a study which drives home once again the vast number of men, arms, and material needed to support the man on the battlefield.

Many of the separate regiments have impressive combat records, while others were relegated to mundane missions of coastal patrols and defense of strategic ports or installations. The author makes no real attempt to draw all these units together in some master plan in the defense of our nation during the opening stages of World War II, yet the intricacy of such a plan is readily apparent as the reader progresses through the book. Another aspect of the author's endeavors is readily apparent with the amount of recorded history gleaned from military archives pertaining to these units. Some units entire recorded history is rendered down to several sentences, while others take several pages. It is obvious to the reader that these units either

suffered a "bad press" or their missions were inconsequential to the overall effort. The author leaves the reader to draw his own conclusions—and yet in the overall tone of his work, it is obvious that no mission assigned any unit was insignificant.

WE CAN'T ALL BE HEROES is short in length—reviews events not familiar to the young professional military officer of today—and does offer some insights on the complexity of organizational structure needed to establish a defensive system of material and men. It also shows the need for more professionalism in the recording of a unit's history—if that unit is to be remembered.

Major Charles E. Griffiths
AUS-Retired

THE UNITED STATES ARMY IN PEACETIME: ESSAYS IN HONOR OF THE BICENTENNIAL, 1775 to 1975. Edited by Robin Higham and Carol Brandt. 223 pages. Military Affairs/Aerospace Historian Publishing, Kansas State University, 1975. \$10.

Except for the introduction, the group of essays are well done and stand as a tribute to the Army. In the introduction, Mr. Theodore Ropp states the essays "smack of public relations" since military experience in nation building is not unique. However, the other essays bring out the point that, unique or not, the Army did the task. Leo E. Oliva, Chairman, Department of History at Fort Hays State College states the Army's contribution to continental expansion was vital. Richard A. Bartlett, History Professor at Florida State University, reviews the Army's important role in developing policy for running the National Park System. Frank Cooling, a noted history author, relates the evolution of the Army as an instrument to be used for flood and disaster relief. One of the more objective essays was written by James O. Breeden, associate professor of Medical History at Southern Methodist University. Mr. Breeden concludes that the Army Medical Service has performed its mission well. Marvin E. Fletcher, author of several works on Black History writes that the Army made significant contributions to minority groups that sought upward

social mobility. Professor D. J. Mrozek concludes the Army's impact in social culture was unintentional and a by-product of officers attempting to develop a more efficient service. J. J. Stokesberry reviews the important contributions to technology, and Professor A. R. Sunseri of Northern Iowa University provides a case study of Iowa to reveal the major impact that defense spending has on an economy. Martin and Joan Kyre conclude that the Army has a deep and permanent place in foreign affairs, mostly through occupations and the attache system. William L. Hauser, a professional military officer, discusses the evolution of the officer from leader to manager, including OPMS. Thoughts are well expressed, but the book is published on poor paper. The many excellent photographs fade through the paper and interfere with reading the reverse side of the page. There is one serious error in a caption under one picture which refers to the Army of "occupation" rather than "liberation" in the Philippines in 1945. Overall, the book makes a fine addition to the military historian's library.

The Late Colonel Carl M. Putnam

THE SUPER SIXTH: History of the 6th Armored Division in World War II and its Post-War Association by George F. Hofmann. Sixth Armored Division Association. 512 Pages. 1975. \$13.50.

After considerable research, under the sponsorship of the Sixth Armored Division Association, George Hofmann has produced a splendid and exceptionally detailed history of the 6th Armored Division during World War II. Using the division's war records, memorandums, letters, diaries, scrapbooks, and hundreds of personal interviews, he traces the division's history from its activation at Fort Knox in February 1942 through the hedgerows of Brittany and the rain and mud of Lorraine; to Bastogne and the Ardennes, and into the Siegfried Line and the hills of Saxony. In addition to his portrayal of the division's history, the author also devotes the last chapter to the Sixth Armored Division Association and heralds its continuing significant accomplishments 30 years after the division was inactivated.

What may be the book's most significant contribution to military research is a well-documented description of the U.S. Army's transformation from horse cavalry to mechanized armor during the period 1920 through 1940. Mr. Hofmann describes the effects of the National Defense Act of 1920 which established the offices of the Chief of Arms for the Infantry, Cavalry, and Field Artillery and the obstacles presented by the incumbents of those offices when the Army attempted to adapt motorization and mechanization to their traditional roles.

While Mr. Hofmann's purpose was to perpetuate the record of the 6th Armored Division in training and combat, he also captured and recorded in one volume the trials and tribulations of a military organization and its men caught in the turmoil of total war. Because the book is detailed and constantly cites names, dates, times, and places, it tends to be dry, but will be interesting to the military reader who desires to trace the origins of a World War II armored division from its birth to inactivation.

*Lieutenant Colonel Ronald A. Duchin
Armor*

ON WAR: Political Violence in the International System by Manus I. Midlarsky. The Free Press. 229 pages. 1975. \$14.95.

Man has studied war ever since he began waging it. Manus I. Midlarsky has taken a novel approach in his examination of this fascinating human phenomenon. The author's basic postulate is that with adequate knowledge of the etiology of war and appropriate recommendations, a deadly institution created by human beings can be controlled by human beings.

Three levels of analysis are used in this examination of war. The international system, the boundary between it and the nation-state, and the nation-state itself are looked at. The author points out that most studies limit themselves to the nation-state; thus his expansion to these levels of analysis gives greater breadth to his work.

Mr. Midlarsky's empirical analysis of war for the period 1815-1945 provides the basis for his treatment of the causes of and the factors affecting both domestic and international violence. His extensive use of mathematical formulas will lose the casual reader. Nonetheless, the statistical probabilities give added credence to his conclusions.

In his final chapter, the author offers some tentative solutions. This study stresses what has happened in the past over his prognosis of the future. Thus the author tells us, "It is clear that a set of priorities for survival must be constructed in which peace is a foremost item," but he does not give us the prophylactic.

*Colonel Corwin A. Mitchell
USATCA*

LAW AND RESPONSIBILITY IN WARFARE: The Vietnam Experience by Peter D. Trooboff. North Carolina Press. 280 pages. 1975. \$13.95.

Put very simply, this collection of essays, arguments, and rebuttals is one of the very best books yet written about the Vietnam War. That's not to say that I like all of it—there are some proposals that would gail any soldier—but it is a fair, balanced review of the ability and willingness of the combatants to conduct those hostilities in accordance with international law, both actual and theoretical.

Peter Trooboff is a Washington lawyer concerned with international law. In his book, he has proposed three major issues, namely methods and means of warfare, weapons of warfare, and individual responsibility in warfare. He has also solicited the thoughts of well-known personalities who participated actively in the Vietnam War, either in support of the U.S. Government or in adamant opposition to it. The issues raised are those that made many headlines during the war: defoliation, relocation, search and destroy missions, use of napalm and tear gas, aerial bombing, command responsibility, and many more, including the morality of that war itself.

In the first part of the book, Trooboff has provided an excellent, succinct review of the historical growth of the laws of warfare and a summary of the arguments presented, but the best part comes later in the vigorous, and often heated, give and take of the various contributors who get a chance to rebut the criticisms of their peers.

Princeton University Professor Richard Falk starts it off with what Ambassador Komer later describes as "Falk's surrealist canvas of Vietnam." It's netting, but interesting to observe how Falk and some other academics will damn eyewitness accounts that dispute them, but accept on faith second- and third-hand reports that support their theses. Some of these arguments remind

you of the comment: "I've made up my mind; don't confuse me with the facts."

Nevertheless, there are several really tough issues raised here, questions that trouble men experienced in law, government, and war. There are plenty of answers too, in fact, more answers than questions and many answers that can't be reconciled with each other. Some of the authors that appear to agree on most points take violent exceptions on other issues, but it's this controversy that provides the value of the book. Other books have been hailed as being the answers to the outbursts and arguments against the Vietnam experience, but they have generally turned out to be something less than that. On the other hand, this book gives the reader, in one volume, both sides of the most controversial disputes that arose during that war, with much of the concomitant exaggeration and emotion. Because the authors are allowed to comment on each other's criticisms, the reader acquires the role of a fascinated bystander during a furious debate between articulate men of strong opinions, giving the reader a more balanced opportunity to select those views he most believes to be right.

Like the tactics problems at Knox and Leavenworth, there are in the legal aspects of warfare few absolute solutions. There are many workable solutions, each depending on how developing situations are evaluated and how the existing rules are interpreted, and by whom. We who are involved professionally in the conduct of war have a vital interest in those future rules that would restrain or constrain us, and this book, more than any other so far, goes a long way to show us how those laws may be developing.

*John R. Byers
Colonel, Retired*

A SOLDIER REPORTS by General William C. Westmoreland. Doubleday and Company, Inc. Garden City, NY. 446 pages. 1976. \$12.95.

A Soldier Reports is an excellent book about General Westmoreland's military career with emphasis on his participation in the Vietnam War. The book makes no excuses, but does call a spade a spade. The narrative points out that great strides were made in Vietnam both politically and militarily. These improvements were evidenced by the free national elections that took place while the country was locked in a struggle for its very existence and in spite of the country's lack of democratic tradition.

Militarily, the modernization was slow because the Secretary of Defense and his top civilian aids had little faith in the Vietnamese. In particular, that slow production of the M-16 was "a grave sin of omission."

The book supports civilian control of the U.S. military, but points out that war is too complex to allow appointed officials who lack military experience, military knowledge, and the will to persevere, to interfere with military operations. In particular, the restrictions placed on the bombing in North Vietnam caused the campaign to communicate weakness and trepidation rather than determination and resolution to the enemy. Failure to understand the North Vietnamese caused the negotiations to become surrender by degrees. Finally, when the going got really tough, many American officials sought simplistic solutions that made the going even tougher. The U.S. must rely on a professional military to fight future wars.

Freedom of the press (and television) is also stressed as important. However, the book points out that the media, like every profession, must have standards. In the case of TET 1968, the news media convinced the public that the allies had suffered a defeat rather than gaining victory. As a result, public opinion caused President Johnson to change his policy and the opportunity to press for a complete victory was lost. In final analysis, and unlike many previous media efforts, the extensive journalistic criticism did not lead to even one meaningful reform.

The book concludes that tanks were decidedly more useful than anticipated, General Vo Nguyen Giap is not a military genius, parochial views of roles and missions slowed development of the helicopter gunship; the code of conduct must be enforced if it is to be meaningful, and finally, the United States abandoned South Vietnam in the end.

The book is written in a logical, interesting manner and should be mandatory reading for every military officer.

The Late Colonel Carl M. Putnam

ROLL CALL ON THE LITTLE BIG HORN, 28 JUNE 1876 by John M. Carroll and Byron Price. The Old Army Press, Ft. Collins, CO. 1680 pages. 1976.

CUSTER BATTLE GUNS by John S. duMont. The Old Army Press, Ft. Collins, CO. 113 pages. 1974. \$8.95.

For the Custer buff, these are a pair of jewels. They won't shed a flood of new

information on the Little Big Horn affair, nor will they add a new approach to that battle. But they will enrich your store of military knowledge and they'll go a long way toward making you feel closer to a part of history.

John Carroll is one of the most prolific Custeriana authors, and in this book compiled with Byron Price, he has added extensively to the growing accumulation of Custer information. This is an amazingly detailed collection of biographies, the personal histories of every single U.S. officer involved in the Little Big Horn campaign. Much of the information on the 70 West Point graduates was extracted from Cullum's famous *Register*, but the authors have gone far beyond that in assembling similar data on all the 122 non-West Pointers and in locating detailed burial information. Each biography includes the officer's assignment in 1876, birthdate, state of record, military history (promotions, assignments, campaigns, awards, and schools), civil history, and publications. For younger readers who think of Little Big Horn as ancient history, it's interesting to observe that 11 of these veterans died during or after 1930! These personal glimpses make fascinating reading and show the reader a whole new vista of military life and duty in the late 1800's.

One of the country's foremost experts on firearms, John S. duMont, has written a definitive book on a little known aspect of the battle: the weapons used by both sides. He also has amassed remarkably detailed information, including original copies of letters, reports and requests pertaining to arms and ammunition issued to the troops in the West. This text is amply illustrated with pictures not only of firearms, but also groups showing uniforms and accoutrements of the period. One of the more interesting parts is the discussion, with photographs, of the weapons used by the Indians. The author shatters a number of myths, principally the charge that the Indians had large numbers of repeating rifles, and he adds a happy lot of interesting sidelights. He describes the diversity of weapons types and notes: "While the Ordnance Department was traditionally slow to adopt more advanced weapon designs and developments, it can also be borne in mind that the War Department was equally restricted by Congress in obtaining appropriations for new weaponry." Some things never change!

In summary, these are fine books for both the history scholar and Cavalry buff, and well worth the cost. They provide easy and engrossing reading, and you'll want to return to them often.

*John R. Byers
Colonel, Retired*

CAN AMERICA WIN THE NEXT WAR? by Drew Middleton. Charles Scribner's Sons. 266 pages. 1975. \$9.95.

The question "Can America win the next war?" is one that faces every American. Unfortunately, in peace, only the military is preoccupied with this question. Drew Middleton, the military correspondent for the *New York Times*, has made an informed and honest assessment of the military capabilities of America and the West in comparison to Soviet capabilities.

The author has divided this assessment into three parts. First he reviews the total American commitments in view of the Soviet threat. In so doing, he highlights probable future hotspots and underlines where and which of America's interests will be dominant in the next decade. His treatment of the Soviet threat is thorough and unencumbered with the emotion of most writers.

Next, he paints a picture of the four services in light of recent events — the changes brought by the all-volunteer force, the aftermath of Vietnam, the impact of the October War, and declining defense budgets. Some will object to his summary treatment of their branch of service, but the author has done an admirable job of sifting the essential information and the picture he paints is not unfavorable.

In the third part, Mr. Middleton analyzes the current Soviet-U.S. politico-military balance. Then he develops the possibility of war at three levels which he labels A, B, and C. These classes relate to low-intensity, mid-intensity, and general war.

Finally, he addresses America's chances of success in each type of confrontation. His assessment is based on the real world and real time. As the author forewarns us in his forward, his conclusions will be unpalatable for many, but he has described things as they are and not as we might wish them to be. Hence, his conclusions that the outlook is dim for an American victory in a major war in Europe, and that the U.S. could win a mid or low-intensity war only if the American people accept the reasons and support the war, are indeed spinechilling.

Can America Win the Next War? is an excellent and timely book which should be read by every voting American

*Colonel Corwin A. Mitchell
USATCA*



Coming in **ARMOR**

"THROUGH THE EYE OF THE HURRICANE"

In his perceptive essay on war and its effect on the soldier, Lieutenant Colonel Andrew P. O'Meara, Jr., observes that, "Man goes off to war, and if he returns, he returns as another man, for time and the savage hurricane of war both leave their indelible marks."

"OPERATION CHROMITE: A STUDY OF GENERALSHIP"

The innovative, and sometimes intuitive, tactics of General Douglas MacArthur are described by Captain James P. Totten in his article about the daring amphibious landing of U.S. Forces at Inchon, Korea in 1950.

"SOVIET ANTITANK DEBATE"

*The Soviet Union is not only aware of the implications of the 1973 Middle East War but demonstrates a deep appreciation of the potentials of antitank technology for the modern battlefield, and changes in Soviet doctrine and force structure reflect this concern. So writes Phillip A. Karber in an article reprinted from **SURVIVAL**, the journal of the International Institute for Strategic Studies.*

"THE SENIOR TROOPER"

What can, or should, the Army's senior NCO's do for their commanders and their units? Command Sergeant Major Walter W. Kreuger, 1st Cavalry Division, answers this and other questions in his professional thought about the duties, functions, and responsibilities of the command sergeant major.

"MANSTEIN'S WINTER MIRACLE"

Captain Ronald J. Brown's analysis of Field Marshall Erich von Manstein's victory over the Russians in the Don Basin during the winter of 1943 reveals many lessons in defensive warfare that are applicable to the modern battlefield.

ARMOR

november-december 1976



FRIEND OR FOE?

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Cover

Illustrating this issue's theme of vehicle recognition and identification, a Soviet T-62 is shown as it might first appear through the gunner's sight. The first of several articles on this theme begins on page 27. (Cover by Stephen Chappell)

ARMOR

the Magazine of Mobile Warfare

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"Four Men And A Lion"

Dear Sir:

Captain John Wallace's "Four Men and a Lion" presented several valid reasons for a return to some form of regimental system. Several other advantages can be suggested. Unit replacement would reduce the number of personnel wasted in transient status and not available for productive service. A permanent regimental home station would permit all ranks to establish roots in the local community with some degree of security, and would also necessarily reduce PCS costs. Regimental affiliation would also reduce the tendency to OER/EER inflation and produce a more accurate appraisal of ability through observation over a period of years. The regiment could also conduct BCT/AIT training for its recruits, assuring them of an immediate and lasting sense of unit identity from day one. It would be reasonable also for the regiment to utilize retired (or combat-disabled) former members as recruiters, perhaps in recruit training, and certainly as civilian employees in other appropriate areas.

There are drawbacks to this concept. War-time losses would probably impact more heavily on certain areas of the country. Given the current force structure, armor, artillery, and air-defense units in particular would probably find themselves doing more rotating to overseas areas than sustaining in CONUS. The concept is certainly worthy of serious study, however.

RICHARD D. LIPSEY, JR.
Captain, Infantry

Fort Benning, GA 31905

"Writing A Readable OER"

Dear Sir:

Colonel Bahnsen's and Major Bill Highlander's article on OERs in the July-August issue of *ARMOR* illustrates some of the personnel problems confronting the Army today.

These are two particularly fine officers. One of the very best fighters in uniform, "Doc" Bahnsen has an imaginative and innovative mind and speaks willingly on tough issues. Bill Highlander is one of the best writers in the Army and can put complex problems into lucid, organized form. Their article brings out many key points about preparing OERs. I think, however, a more appropriate title might have been "Writing A Max OER." Why? Except for a few com-

ments about inferior officers, the article emphasizes the outstanding officer; it says nothing about the good man. Just read the examples again. That's what prompts this letter; I think the authors have inadvertently added to an already critical problem, inflation.

The authors advise raters to "present a memorable image of the rated officer—good or bad." They give examples of water walkers but point that these "same techniques (of presentation) can be used to slam an inferior officer." Okay, that takes care of both ends of the bell curve (pear-shaped curve?), but what about the vast majority of officers that supposedly are in the middle? What about the officer who does a first rate job but occasionally does get his feet wet, the kind who'll never be Chief of Staff but you'd want on your flank in a firefight. What do you say about him?

The truth. Write the truth about him and about each of the others. This doesn't mean you have to enumerate all his characteristics, good and bad. You don't have to expound on every asset and picayunish shortcoming (General Abrams used to say that being honest doesn't mean you have to go around blurting out the truth at every opportunity!) It does mean you have to be fair, fair to the rated officer, fair to his peers, and fair to every other officer in the Army.

Now I'm sure Doc, Bill, and many others are shaking their heads and thinking that, while this may be a fine ideal, it won't wash in the real world. The authors allude to but never quite make the point that rating honestly is important. Others may charge that even the slightest comment below "Outstanding" will do your man in. I understand that attitude, but that's what got us into this pickle and a return to honest ratings is essential if the Army is to have any integrity in its selection system. That return may be gradual, but it's essential. General Abrams tried, in his well known message to the field, to establish a standard of rating fairness and integrity. The results of that and subsequent qualifying instructions serve to illustrate the increasingly critical problem of inflation.

To explain the grave importance of fair ratings, let's return to the article and look at selected sentences

"Inflation has rendered the numerical score nearly useless as a discriminator."

"No one really knows what a selection board member will single out for review when going through the records."

"Why some officers are selected for promo-

tion and others are not (except for the obviously superior and the obviously inferior) remains elusive and undefined."

"If you were a board member, how would you interpret these remarks?"

Those last two sentences are the key. Go ahead, put yourself in the place of a board member. How would you select 200 majors for promotion out of 1,000, especially if you discovered that 700 had outstanding files and 300 were max? How would you know which ones were "obviously superior?" How would you select the best qualified? What criteria would you use?

That's the problem. We use the OERs to help identify and sort out, at a given instant, the better officers among us so they can be sent to schools or promoted, and to single out the worst so they can be phased out. The job is complicated, however, by each rater who, for whatever reason, pads his reports and says his good officers are really outstanding. There are unfortunately a large number of raters who don't have the moral courage to tell a subordinate that he doesn't measure up. There are others who want to see their subordinates rewarded for their loyal support and hard work and will, with all good intentions, exaggerate strengths and gloss over faults. The result is that we end up with only two categories of officers, outstanding and unsatisfactory. (In a facetious article, I once lamented this fact and proposed establishing a new group of officers, the Average Officer Corps, distinguished for their consistent mediocrity.)

Well, let me assure you, the boards will find ways to sort the files out. And, as long as they have to use inflated OERs, those ways will remain, as Doc and Bill say, "elusive and undefined." The boards may opt for education or decorations or certain assignments or physical profile or whatever, the only thing you can be sure of is that they'll find some way. Just as you would if you were a member.

So it's up to each rating officer to make clear to the boards just exactly how competent each subordinate really is, accepting the fact that his report may subsequently be the discriminator at some future board. That takes maturity and a sense of personal responsibility—but isn't that what we expect of our officers?

The authors should be complimented on highlighting an important issue and for illustrating the need for clarity. I've often wondered what one battalion commander (an Infantryman) meant when he wrote of his recon platoon leader: "This officer has the

morals one expects of a Cavalryman." (Since that lieutenant is now a LTC, I guess the boards interpreted the comment favorably.)

Be sure that what you write is what you mean, and that what you write will be clear to every board member who will read that report, now and 5 and 10 years from now. Be succinct, be clear, be fair.

JOHN R BYERS
Colonel, USA Retired

"Gaining the Edge"

Dear Sir

Just as Lieutenant Colonel Bahnsen in his January-February 1976 *ARMOR* article, "Gaining the Edge," admits to the realities of 3,000 U.S. tanks fighting an enemy three times that number, he'll have to come to grips with the fact that the infantry wants "hot shots" for its *TOW/Dragon* equipment, the airborne for its airborne units, the engineers for ADM, ADA for sophisticated equipment, ad nauseam.

Colonel Bahnsen proposes an armor command? I thought I was reading Mr Macksey's article, "Craftsmen in Armor" (same issue), in which the history of armor development is told. The past is history and General Hobart's and General Guderian's emphasis and specialization in armor is over. Combined arms is really here to stay.

We've become too attuned to posing grand and unrealistic solutions to what could be phrased as unsolvable problems. You don't need a separate Armor Training Command—Fort Knox is the Armor Training Center—nor will armor get the cream of the crop. Instead, simplify your training; reduce the complexity of the gadgetry and get on with training. Armor has got its scout equipped with so much complex equipment that he can't afford to leave his vehicle, let alone adequately employ it. The disparity between mission and training is such that anyone who thinks a trained scout in a *Sheridan* is a scout does not understand the mission. Colonel Bahnsen, you'll continue to have (in some instances) high school dropouts driving that \$700,000+ tank; that's a fact. Now, as Chief of Collective Training, what's the best method with which we can train the soldier? Please, sir, no utopian solutions?

JOHN P. LAWTON
Major, Infantry

APO NY 09107

Gun Pod For Main Battle Tanks

Dear Sir,

One of the hazards of the modern battlefield, as illustrated by the 1973 October War, is the Antitank Guided Weapon, or ATGW.

The losses suffered by Israeli Armor to these weapons has led to a reaffirmation of

the old combined-arms doctrine—Armor protects Infantry, Infantry protects Armor, and both are protected by, and protect Artillery.

However, there will always be situations in which Armor is exposed to these weapons without the assistance of Infantry and Artillery (including antiaircraft). Also, a main battle tank (MBT) may acquire a target which, while too much for the 7.62-mm coax gun, does not really justify the expenditure of main gun ammunition. In addition, the MBT needs an antiaircraft gun more effective than the caliber .50 cupola machinegun, or a main gun *BEEHIVE* round.

Therefore, I would like to make the following proposal.

Equip every MBT with a turret-mounted, external, gun pod containing a 20-mm gun and 500 rounds of ammunition.

As a layman, I have watched the *M-139*, *M-73*, and *M-219* guns with increasing dismay. So, I am going to propose the use of a reliable gun already proven by years of service.

The gun pod itself would be a flat plate "box" mounted on the left rear of the turret, top of the pod to be level with the top of the turret. The thickness of the plate should be sufficient to protect the gun against shell fragments and 7.62-mm antipersonnel rounds.

The gun mount would have only slight horizontal adjustment, and would follow the main gun in both traverse and elevation. It would be, in effect, a 20-mm coax with additional elevation for antiaircraft fire. It would have none of the disadvantages of an internally mounted gun, and would not add to the profile of the turret any more than the usual stowage.

For the gun itself, I propose the Navy 20-mm *Mark 16* gun. The *Mark 16* is a surface mount modification of the *M-3/M-12/M-24* aircraft guns, is gas operated, and fires from an open bolt. It has been in service since the late 1940's and is used in the *A-1 Skyraider*, *A-4 Skyhawk*, and *F-8 Crusader*. In the pod application, the gun would have an aircraft-type firing solenoid and charger mechanism.

I feel that a gun pod of this type is badly needed by Armor. Infantry equipped with ATGW and RPG expect to be fired at by rifle-caliber machineguns, they don't expect to receive HE/Frag. And, several pilots that I've talked to said that the knowledge that every MBT has a high-rate 20-mm gun would be very depressing, and not conducive to aggressive attacks.

The fact that my gun pod uses a Navy gun shouldn't be too depressing, you are already using the Air Force *Vulcan* gun.

Since my idea has been received with joy by several Armor officers, and is simple, reliable, effective, and relatively inexpensive, I doubt that it will be received by Army Weapons Command with any degree of

enthusiasm. I hope however, that my gun pod will take hold with some of the more progressive people in Armor and will lead to something good.

ROY L. WILSON, JR
Harlem, GA 30814

"The Commander's Hatch"

Dear Sir

The Commander's Hatch article on tank design, Part III, in the January-February 1976 issue has some errors which must be corrected. The article states that the *M-60* tank reverted to RHA hull whereas the hull is, in fact, cast.

Further, it goes on to say that when the *XM-803* died, the U.S. Army, over the protests of most of its armor community, affixed turrets designed and built for the *XM-803* to an *M-60* hull to make the *M-60A2*. This is totally wrong! There is no connection between the *XM-803* and the *M-60A2* whatsoever; they were separate programs under separate project managers. In fact, the *M-60A2*, or *M-60A1E2* as it was earlier called, was first built in 1968-69 as an interim missile firing tank. The program was stopped due to technical problems, but the problems were solved and the tanks were retrofitted in FY 72 and 73. The *M-60A2* is one of the most tested tanks, prior to its acceptance by the Army, in the history of Armor. For those that don't know, an entire battalion of *M-60A2s* was tested at Fort Hood.

As for the statement that it was accepted over protests of most of its Armor community; those who protested were probably misinformed—perhaps they thought it came from the *XM-803* program.

DENNIS L. SIMMONS
Major, Armor

APO NY 09066

The Maintenance Factor

Dear Sir,

The ideas presented in "Trainers, Rise Up" (July-August 1976) deserve much support. To those ideas I would add another—*mobility or the Maintenance Factor*.

Having been a company officer in Artillery, Ordnance, and now Armor, I have found that good maintenance and good training are mutually dependent. Training is fragmented and inefficient because commanders (read "trainers") are afraid that to use their equipment is to deadline it. The end result is that crews never do have more than a passing acquaintance with all of their equipment, and thus, are never properly trained. Seldom have I seen equipment "wear out" from use. But I have seen rotted seals and gaskets, dead batteries, inoperable

hydraulics, corroded electrical connections—all from *disuse*. I have also seen damage by crews because they don't regularly train with their equipment and therefore do not know its proper operation.

If "trainers" would use all of their equipment, especially in FTX's and even in seemingly unrelated training, they would in the long run reduce the deadline rate and improve their crew and equipment combat readiness. After all, to quote from "A Mechanic's Opinion," a "tank... team has five components... the (crew) and the tank." Trainers must tell their commanders all the way up the line that they *cannot* perform the mission—to have a combat-ready unit—without full and unrestricted equipment and maintenance support! (In the Guard and Reserve it is not unusual to have a critical piece of equipment deadlined for over a year.) With this support we would move toward units that could *Shoot, Move, and Communicate!*

BRUCE E. BRUDER
Captain, Armor, USAR

Little Valley, NY 14755

More on Matilda

Dear Sir:

Further to General Grieve's letter concerning the name of the British Infantry Tank *MK I* (*ARMOR*, May-June 1976), although I agree that during the early forties the name "*Matilda*" meant the Infantry Tank *MK II* and the *MK I* was simply the *MK I*, a number of fairly authoritative books on armored vehicles do refer to the same name (modified) for both tanks. "British and American Tanks of World War II" by Chamberlain and Ellis, 1969, for example, refers to the *A-11* infantry tank *MK I*, as *Matilda I* and the *A-12* infantry tank *MK II*, as *Matilda II*. Following the Dunkirk evacuation the remaining infantry tank *MK I*'s were withdrawn from combat service and "*Matilda*" referred only to the infantry tank *MK II*. These latter included infantry tank *MK II Matilda I*, infantry tank *MK II Matilda II*, infantry tank *MK IIA Matilda III* and numerous other variants such as the *Matildas IV, V, III CS, IV CS* and *II CDL*, etc. Note that a "*Matilda I*" existed both for the *A-11* and *A-12* tanks. As a point of interest, the official publications I referred to did not mention a name for the infantry tank *MK I*.

While the nomenclature of the *A-11* tank is open to question, there is one area of General Starry's "Tank Design: Ours and Theirs" which I take exception to. This was his identification of German tanks by "*PK*" (*PK-III*, etc.) instead of the correct *Pz Kpfw*, but at least this was better than the Allied habit of using "*Mark*" in publications illustrating German armored vehicles (*Mark III*, etc.)

Turning to another subject, great was my surprise when looking through my copy of *ARMOR*, November-December 1975, to see two large sized photographs of the British *Chieftain* tank (pages 30 & 31). Even greater was my surprise to read these were prototypes for the new "All-American" *XM-1* tank. No reason why not, of course, except that I had expected something different, particularly regarding "shot traps" around the turret!

Once again, a favorite "armchair subject" has come up for discussion, namely turreted, or turretless tanks. While it is true that a tank does not have to have a turret, it does need one if it is to be an effective all-round combat vehicle in the latter half of the 20th century! Also there is plenty of precedent from recent history to demonstrate this. The much quoted Swedish *S-Tank (Stridsvagn 103A)* is actually only a glorified self-propelled gun, somewhat similar in configuration to the German *Jagdpanzer IV* guns of World War II. Rich in gadgetry, it would probably be a maintenance nightmare in a combat situation but might, however, help to solve the problem of tank crews in a diminishing "All Volunteer Army."

During the Western Desert Campaign in North Africa, the British Army was particularly glad to get the *M-3 (Grant and Lee)* tanks which at last enabled them to meet the firepower of the German tanks, but the lack of turret main armament was a decided disadvantage (duly noted in the United States) which was not rectified until the *M-4 (Sherman)* arrived in quantities. Here was ample proof, in combat, of the essentialness of a turret. Many times disabled tanks could not move, but continued to give all-round fire from their turret mounted main armament. Try doing that with an *S-Tank*! Or, let the armchair tank designer sit in his turretless tank, stuck in the mud and facing forward, while an enemy tank approaches from the side and proceeds to pump armor-piercing shot into him.

Another oft-quoted event is the German use of turretless self-propelled antitank guns. While these vehicles, in their developed forms, were fine, powerful equipments, they were mostly an innovation to save production time and material which would have gone to tank turrets.

Tanks will continue to fit into the combat scene, even after a nuclear holocaust—in fact they might be the only surviving vehicles. Instead of despairing over guided missiles with shaped charges or tank guns firing rotating guided projectiles, a concerted effort should be made into new ways of sloping armor, sandwiching, spacing, etc., to overcome a reasonable percentage of antitank weapons. The turret and its ring are often thought of as a weak spot (and is) but a well sloped turret (as the Russians use) with its bottom edge recessed into the top of

the hull would provide protection from "shot-traps". This type of interface would require more extensive machining and some rethinking on turret-to-hull width relationships, but the effort would be worthwhile. The Soviet tanks don't come cheap, either, but we don't hear them griping about that fact (if they could) and they are not likely to grant us a price index handicap in the event of a confrontation.

In summary, the tank looks like it's here to stay and, as such, needs to be the most powerful type of combat vehicle available, capable of providing instant fire support against a variety of targets often widely dispersed. Only a turret can provide the mount necessary for the main armament of a tank to meet these stringent requirements.

LEONARD E. CAPON

Hawthorne, CA 90250

Christie Suspension

Dear Sir:

I was interested to read the letter from Mr. George F. Hofmann in the May-June publication of your excellent magazine.

The truth is, of course, that there cannot be any confusion between the Christie system and a torsion bar suspension system of fighting vehicles. The last Russian tank to use a Christie type suspension was the *T-34* and the last British tank to do so was the *Chariotier*. As your correspondent says, the Christie system used long coil springs which were housed between two spaced hull side plates. It can be argued that Christie's suspension had much superior suspension characteristics than the single torsion bar or even the tube-over-bar system because of the large vertical wheel movement which is possible with the Christie layout and its ability to provide a variable spring rate given suitable geometry. However, it is wasteful in hull space, and battle damage is difficult to repair with the result that it is no longer in use. Only a good hydropneumatic system can provide a ride comparable to the Christie suspension. Christie understood the advantage of large wheel movement in that it avoids transmitting undue vertical acceleration to the hull when moving at speed over rough terrain.

The majority of tanks in service today use torsion bar systems with the exception of the British *Centurion* and *Chieftain*, which use a modified Horstmann type, and the Swedish *S-Tank* which is hydropneumatic. Hydropneumatics are being increasingly employed on prototypes for new tank designs so perhaps we can look forward to wheel travel on future AFV's in the order of Christie's 14 inches or perhaps even more.

BS HEATH
Colonel, Retired

Kent, England





THE COMMANDER'S HATCH

MG JOHN W. McENERY
Commandant
U.S. Army Armor School

Shoot First -- and Win !

When we talk tank gunnery we usually do so in terms of how often targets are hit. This is natural. However, there is another very vital factor, and that is the time it takes to get off the first round. This is the other true measure of crew training. An untrained crew or one that hasn't worked together can eventually acquire a target and hit it, but it takes real team work and constant practice for a crew to acquire a target, lay on the target *rapidly* and hit it. Why is this so important? Tests have shown that at 1,000 meters, for instance, in a tank-on-tank duel, *M-60A1* vs. *T-62*, the tank that shoots *first* has a much greater chance of winning. If the *M-60A1* shoots *first* its chances are 7 out of 10 of *winning* but if that same *M-60A1* shoots *second* its chances of winning are only 1 out of 10. Our gunnery literature has emphasized the importance of firing fast, first, and hitting targets. Battlesight engagement times of 5 seconds are possible and must be attained if we expect to survive on the modern battlefield. Battlesight engagements give us the capability to shoot from the hip, while the precision engagements (ranging) give us a better hit probability at ranges in excess of battlesight.

Our crews are naturally at a peak of proficiency when they fire Table VIII following the firing of Tables I thru VII. In other words, they have been through a period of intensive training and they have worked their way up to the Crew Qualification Table—Table VIII. Because of turbulence and lack of training, our crews lose proficiency rapidly within a few months following the firing of Table VIII. In fact, after one month 50 percent of a battalion's crews will have ex-

perienced the loss of at least one crew member. The following statistics show the results of a test run by the TRADOC Combined Arms Test Activity (TCATA) of a tank battalion at Fort Hood, TX.

Accuracy

Intensive Gunnery, Mar 75
 Table VIII (no preparation), Jan 76
 Tables I - VIII, Mar 76

Probability of Hit

7 to 10
 6 of 10
 8½ of 10

Time to Fire (Precision Engagement)

Intensive Gunnery, Mar 75
 Table VIII (no preparation), Jan 76
 Tables I - VIII, Mar 76

Time-to-First Round

10 sec
 20 sec
 10 sec

These results are representative of our battalions world wide. You'll see that there was a loss of accuracy from the time they fired Table VIII at the end of the complete gunnery program in March '75 to the time they were required to fire Table VIII only, without any preparation. However, the loss was not that severe over their previous level of proficiency. The next time they fired the complete course in March '76 they did much better. Their proficiency climbed up to a hit probability of 8½ out of 10. This is a result of two factors; they had fired only two months before, and they had a much better preparatory program. Much more serious was the loss in time-to-fire from March to January. As one can see, they went from an average of 10 seconds to 20 seconds to get off the first round. Certainly, this tank battalion, had it been sent into combat in January, would not have done very well, tank-on-tank.

What can we do about it? You may recall that in the May-June issue of *ARMOR* I talked about the new firing tables which will encourage subcaliber or main gun firing every month. These tables will be printed in the new FM 17-12 which will be forwarded to TRADOC in December 1976 for subsequent publication in March 1977. At the same time TC 17-12-7 will list subcaliber devices and scaled ranges from which commanders can choose depending on their particular needs. These devices range from the Telford device (a .50 caliber machinegun that straps onto the main gun—see *ARMOR* September-October 1976) with which Table VIII and IX can be closely approximated, to the *M-55* laser which can be

used in the motor park. Many factors dictate that we continue to practice tank gunnery and to evaluate crew gunnery skills through live firing with the main gun. There will always be this need.

But, it will not always be possible to fire monthly because of the lack of ranges. Fortunately, many of our active components in the U.S. and in Korea do not have this restriction, but those in Germany certainly do. Reserve components also are severely constrained by a lack of space, time and resources. Additionally, spiraling costs of ammunition will always be a restriction. Notwithstanding, it is possible to without live firing. Well thought out, competitive training without live firing will allow battalions to have well coordinated crews who can acquire and lay on a target rapidly. How can we do this?

It can even be done in the motor park as long as one can see a reasonable distance in order to be able to detect and lay on a number of different targets. These targets should appear on command of a controller so that the entire crew is exercised in acquiring a target and then laying on it rapidly.

Terrain permitting, a better exercise would be one wherein a tank would move on a certain path and targets would appear to the front and flanks. The tank would then engage and be timed in this exercise. A company commander, for instance, might have one platoon acting as targets, one platoon going through the exercise, and one platoon acting as scorers. Targets could vary widely. They might be real tanks, if that's practical. They might be trucks, representing tanks. They could be balloons, which are raised to represent helicopters. They could even be small silhouettes raised and waved by hand to represent a tank. Almost anything could be used as long as the crews being tested understand what they are looking for and what it represents.

Scoring would be done by a neutral grader who would time the period from the appearance of the target until the gunner

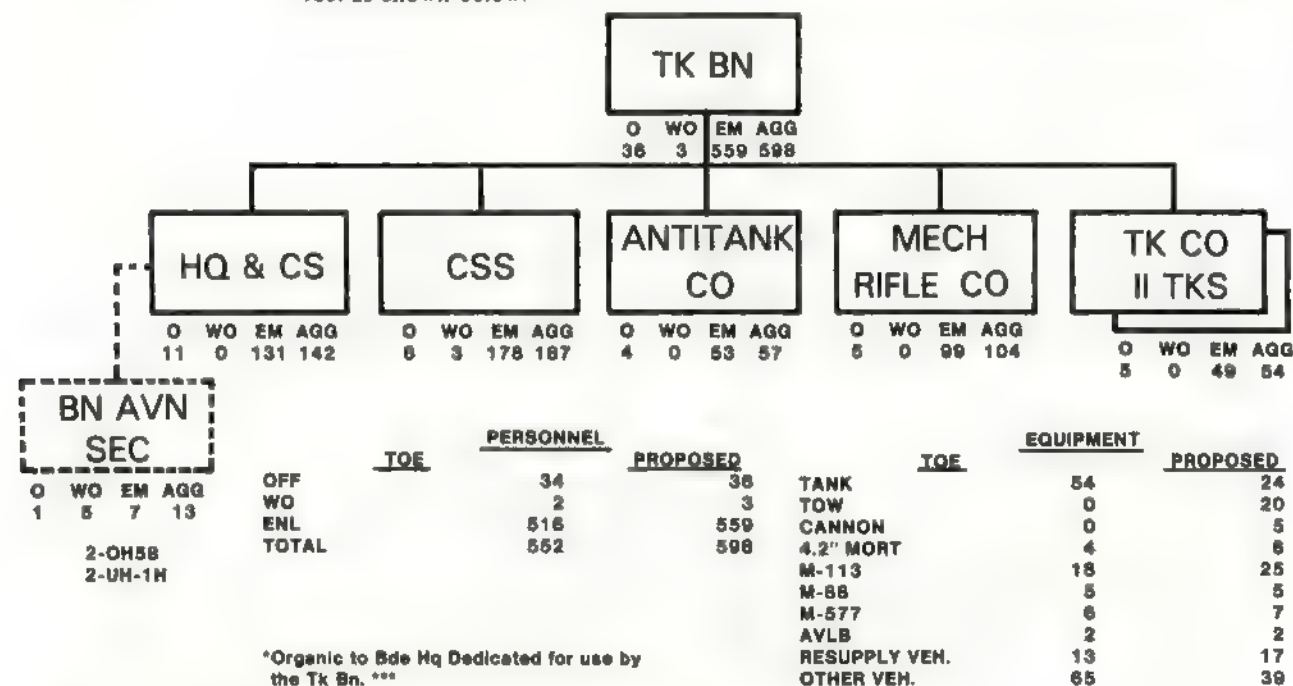
announced "ON THE WAY." Before awarding a score he would ensure that the TC had ranged accurately, if required, and that the gunner and loader had performed their duties of indexing ammunition, loading the main gun, and activating firing switches and safeties. He would also have to check the lay of the gunner's reticle on stationary targets.

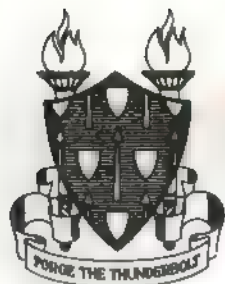
This type of exercise, if run monthly for all crews, would ensure that they maintain a proficiency of 5-10 seconds to lay on a target and get a round off. If all crews were required to participate and random crews were picked from each company for a battalion, a brigade, and a division competition every month, crews throughout the division would maintain a high level of proficiency. Competition is the key, be it at the company or higher level.

In summary, we can no longer afford to fire tank gunnery once a year and attain a peak of proficiency only to lose it again in a few months. In order to be truly ready, our crews must be at the peak of proficiency 12 months of the year. This can only be done if commanders insist on competitive firing and nonfiring exercises every month.



CORRECTION: Due to an editing oversight, some of the authorized strengths of the Conceptualized Tank Battalion on page 5 of the September-October issue were incorrect. They are correct as shown below.





FORGING THE THUNDERBOLT

TRAINING EXTENSION COURSES

More than 50 Training Extension Course (TEC), lessons that have been developed and produced by the U.S. Army Armor School are now available to all battalions of the Army's active components, reserve, and national guard.

TEC lessons are multimedia, soldier-tested, performance-oriented, prepackaged training. Most TEC lessons are designed for audio-visual presentation using the Beseler Cue/See training device. This machine uses a Super 8-mm film strip that is synchronized to a narration recorded on a standard audio cassette. The visuals can be presented as single frame with stop action or as a full-speed motion sequence or as any combination of the two. For individual and small group instruction, the visuals are presented on the 6-by 8-inch screen of the machine. For large groups, the visuals are projected from the back of the machine onto a large screen. In the audio mode, the lesson is recorded on a standard tape cassette and is played by the student as he performs specific job skills while actually working with the equipment being studied. Other features of the TEC lessons are the standardization of instruction that is achieved for a given subject and the proven teaching quality of the lessons. Each TEC lesson is soldier-tested to ensure that it will, in fact, enable the student to learn to perform certain tasks.

The validation of the lessons is accomplished by testing the objectives, using soldiers for whom the instruction is designed. For example, if the lesson is targeted for tank commanders of the *M-60A1*, crews of *M-60A1* tanks take the pilot lesson, not the crews of *M-551s*. During the validation, the student is tested before and after he completes the lesson. If the pretest shows that the soldier already knows the subject being taught, he is not used for the validation because his score on the posttest would create inaccurate information as to the effectiveness of the lesson. On the other hand, if members of the test group fail the pretest, take the lesson, and then fail to score satisfactorily on the posttest, the lesson is redesigned and retested until a representative sample of the target audience scores well on the posttest.

The performance oriented aspect of TEC lessons also enhances their training value. The questions that are used to test the soldier, and the lesson itself, are based on the soldier's ability to learn a task and then perform it. For instance, the Armored Vehicle Recognition lessons that are described in this issue of *ARMOR* don't ask the student to explain the difference between the *T-62* and the *Leopard*. That isn't the performance that is required of soldiers in the field. Tank crews don't have to build tanks, all they have to



know is whether or not to shoot at one when they encounter it in combat. This performance orientation is common to all TEC lessons.

A TEC lesson packet includes a student instruction sheet which tells the student and instructor what the lesson covers, how much time is required to complete the lesson, and what equipment is necessary. The instructions to the student also list references and prerequisites, if any, and specify for whom the lesson is intended. A letter of administrative instructions is also provided with each TEC lesson. This document lists the objective of the lesson and specifies the standards required for successful completion of the lesson. Additionally, administrative instructions include a pretest, with an answer key, and provide recommendations to the instructor concerning the use of the lesson.

An instructor does not have to be a subject matter expert to administer a TEC lesson. As an example, a training NCO in a learning center might be a tanker but, since TEC lessons are so self-explanatory, he can supervise a unit clerk who is taking a lesson on correspondence. If a soldier's score on the self-evaluation test falls below the standards set by the administrative instructors, he simply rewinds the tape and film and repeats the lesson until he is satisfied that he has mastered the material presented.

Since identical instructions in a subject are distributed

worldwide, a soldier who studied a TEC lesson on target engagement before joining a unit in Germany will have received the same instruction that he would have received in a learning center at Fort Hood. TEC lessons can also be used to fill the role of remedial training, cross-training, concurrent training, and on-the-job training.

Equipment for viewing the lessons is issued on the basis of eight Beseler Cue/See machines per battalion of the Army's active components and five machines to battalions of the Army Reserve and National Guard. However, Reserve and National Guard units may requisition additional machines through Training Aids Service Offices if the need arises. In addition to the audio-visual machines, each of the Army's battalions is issued four tape players for use with the audio-only lessons. Organizational maintenance of the equipment consists of cleaning and replacement of bulbs in the audio-visual machine and general cleaning of the tape players. If any repairs are required, they are accomplished within 24

hours, or a direct exchange is made for the item involved.

TEC lessons are here to stay and they add a new dimension to training worldwide. Lessons either in the field or scheduled to be in the field in the near future include a series on before-, during-, and after-operation maintenance, initial fire commands, target engagement, subsequent fire commands, ammunition identification and handling, direct fire control instruments—all pertaining to the *M-60A1* and *M-551*. Other lessons deal with target acquisition, machineguns, communications, land navigation, and call-for-fire. Lessons now under development at the Armor School are a series for the *M-60A2* tank; demolitions; bridge classification; maintenance of the *GOER*, *M-113*, and 5-ton vehicles; and advanced reconnaissance techniques.

The Training Extension Course program is not designed to, nor can it ever, replace instructors or supervisors. However, it can be used to make their job easier and their training more effective.

KEYS TO SUCCESS

In the September-October 1974 *ARMOR* Magazine, Major Edward Y. Hall of the Automotive Department, U.S. Army Armor School, stated in an open letter to the employers of tracked vehicle mechanics (TVMs) the importance of the TVM. He included a brief summary about the program of instruction for the TVM course available in the Automotive Department. This article will familiarize you with another "Key Man" in your unit the *turret mechanic*.

Before outlining the Programs of Instructions (POIs) for organizational turret maintenance courses presented by the Maintenance Division of the Weapons Department, let's discuss some of the systems which must be maintained by your unit mechanic. That rotating object on top of the hull is more than just a bonnet. Like communication and automotive components, the turret is comprised of several systems. First, and most familiar, are the weapons. The main gun and the coaxially- and cupola-mounted machineguns present few maintenance problems. Operators, crews, and mechanics understand functioning and maintenance requirements. But, the electrical, hydraulic, stabilization, fire control, range finder and gas particulate systems, which are more complicated and sophisticated in design and operation, offer a greater challenge to both operator and mechanic. Tank crews are well-trained in the use of these systems, and do a good job with the equipment when it functions properly. The problem has been, and still is in far too many units, failure to insure that adequate organizational maintenance is being performed. Organizational maintenance of turrets is a continuous proposition. Scheduled maintenance includes mandatory services which must be performed on a periodic basis, or equipment becomes faulty.

Quarterly maintenance services have been geared toward accomplishing the automotive portion of the "Q" service. The organizational maintenance system has always been oriented toward the automotive components and is understandable when you consider that key maintenance person-

nel i.e., battalion maintenance technician, battalion and company motor sergeants, probably have not been trained in turret operation and repair. Too often turret systems are ignored until time for annual tank gunnery qualification. Worse yet, turrets may not be maintained in a combat ready status. Unit repair parts prescribed load lists (PLL) are from 80 to 90 percent filled with automotive items. Supervisors are not anticipating, nor planning for, breakdowns which are likely to occur to the turret during training. Additionally, money is not available, and the supply system cannot support repair parts demands which are rushed upon the system when breakdowns occur. Supervisors must plan ahead, perform dedicated maintenance, and get the demands for PLL items into the supply system on a regular basis. Don't wait. You have got to emphasize turret maintenance along with automotive maintenance to insure it receives an equal priority. Your maintenance personnel, not being familiar with turret systems, are apt to overlook it in favor of the system they are familiar with.

Before the advent of the Master Gunner Course at the Armor School, there were few, if any, school-trained personnel available to supervise the turret mechanic. The unit turret mechanic has literally been on his own in organization motor pools. His effectiveness has been based on self-pride in job accomplishment and the rarity of having a senior turret mechanic in his unit who could provide advice and assistance. The Army has recognized the problem and has authorized an E-6, turret maintenance supervisor, in each battalion and squadron maintenance section. A master gunner, thoroughly trained in turret maintenance, has also been added to armor and cavalry units. The turret maintenance supervisors and master gunners will help eliminate some of the shortcomings in supervision of turret maintenance. Yet, even with the addition of the supervisors and master gunners, unit officers and noncommissioned officers must become more involved in turret maintenance. The Armor



The best friend of the man who works here is the turret mechanic.

School has also recognized the problem and has redesigned programs of instruction (POIs) which are intended to familiarize officers and NCO's with turret mechanic's duties and responsibilities.

Training in turret maintenance which is presented by the Armor School includes three turret mechanic courses. Students attending the MOS 45N course receive training on the turret systems of the *M-60* and *M-60A1* tank and are taught limited functions of the Combat Engineer Vehicle, *M-728*. Students attending the MOS 45P course receive training on the *M-551* and *M-551A1*. A third course offers students training on the *M-60A2* tank and graduates are awarded a MOS 45R after course completion.

Some duties of each turret mechanic are common. For instance, all of them know when and how to exercise the recoil mechanism, purge sights with nitrogen, check synchronization and alignment of the sighting systems, and service the hydraulic and stabilization systems. All must be capable of employing test equipment and diagnosing malfunctions. Turret mechanics receive intensified training in the use of technical manuals, basic theory of electricity, troubleshooting procedures, use of special tools, test equipment, replacement of components, adjustments, and quarterly checks and services of the turret systems. Completing a course produces

a well trained turret mechanic. OJT under the guidance of an experienced turret mechanic or qualified supervisor (Turret Maintenance Supervisor) will result in an even better trained mechanic. Until that time, unit officers and noncommissioned officers must become technically familiar enough with the systems to effectively supervise the performance of organizational turret maintenance.

The Master Gunner course is similar to the turret mechanic courses, with the nuts and bolts (simple component removal and installation) operations deleted. The primary course objectives deal with turret systems theory, troubleshooting, identification of malfunctions, adjustments, and repair at the organizational level as directed by the technical manual maintenance allocation chart. While graduates of the Master Gunner course are not trained to be motor pool maintenance personnel, they are fully capable of assisting unit commanders by evaluating turret maintenance practices and equipment status and in training other personnel in the area of turret maintenance.

Another course that includes training in turret maintenance is the one for motor officers. This course includes organizational maintenance of the *M-60*, *M-60A1*, *M-551*, and *M-551A1* turret systems. For motor officers assigned to units equipped with *M-60A2* tanks, instruction on the *A2* is presented in lieu of the *M-60* or *M-60A1* tank. Motor officer training includes duties and responsibilities of the turret mechanic, preventive maintenance indicators, quarterly maintenance checks and services, and the use of selected DA forms. A Motor Sergeants course, similar to the MO course, is being developed. Also included in turret maintenance familiarization are the Armor Officer Advanced and Armor Officer Basic Courses.

Unit personnel are being trained at the Armor School to treat maintenance as a *must*. With this training in mind, officers and NCOs need to be aware of maintenance personnel duties and should familiarize themselves with the technical terms and functions of the different systems.

Well trained *doers* and *supervisors* are your "Keys to Success."

TANK FORCE MANAGEMENT GROUP

Training and Doctrine Command (TRADOC) recently conducted two studies that have identified certain shortcomings in our tank force which preclude the force from reaching its full potential. One study, a New Equipment Training (NET) assessment of Soviet and U.S. tank crew training (directed by the Department of Defense) led to a second TRADOC study called the Total Tank System Study. Its purpose was to identify and analyze the factors which cause less than full realization of the potential effectiveness of the tank force. As a result of the findings of the Total Tank System Study, a Tank Force Management Group has been established in the Office of the Chief of Staff, Army, led by LTG James Kalergis, who was recalled to active duty for the assignment. This group will further study the tank force and make recommendations to the Chief of Staff for improvements in the force which may ultimately lead to total tank management system. ▲

The Soviet Antitank Debate



by Phillip A. Karber

On 21 June 1339, an outnumbered group of Swiss Infantry, armed with hand-held pikes, stood up to the cream of feudal armor, unseated the knights from their armored chargers and ushered in a new era of warfare. The battle of Laupen was a tactical innovation which not only established the defense superiority of light infantry over the shock action of mobile and heavily armored forces, but also announced a political and social revolution. With striking similarity this 'democratization of warfare' was repeated 634 years later in the opening days of the 1973 Middle East War, when an Arab infantry force armed with antitank weapons met and brought to a halt an Israeli tank offensive.

The implications of the Arab success have been widely discussed in the West. Numerous commentators have agreed that the balance has swung against the tank, which has dominated the battlefield since World War II. Many have taken heart that the same weapons which provided the Arab success, the antitank guided missile (ATGM) and the hand-held antitank grenade launcher, would give NATO a greatly improved chance of offsetting the Warsaw Pact's tank superiority in Central Europe. Indeed, one study has claimed that the ground forces of the Warsaw Pact and Soviet Union are tank-heavy, even tank-dependent, suggesting that "Soviet tables of organization are unduly influenced by experiences gained in a war of 30 years ago and that a certain amount of 'battleship thinking' permeates their military intellectual environment."¹

Another study concludes that Soviet reliance on tanks as the core of the Army's shock and initial striking power is not likely to change. "The debate in Western military circles that followed the Yom Kippur War over the viability of armor in a battlefield environment dominated by precision-guided munitions has had no visible parallel in the U.S.S.R."²

These conclusions reveal a *naivete* about Soviet force structure and ignore recent Soviet doctrinal literature. The Soviet Union is not only aware of the implications of the 1973 Middle East War—after all it was Soviet antitank weapons that the Arab forces used—but demonstrates a deep appreciation of the potentials of antitank technology for the modern battlefield in professional military writings. Changes in Soviet doctrine and force structure reflect this concern and the implications are important for Western defense.

In mid-November 1974, a military science conference of the ground troops was held at the Malinovsky Tank Academy.³ Participating were more than 200 marshals, generals and officers of the central apparatus, military districts, and groups of Soviet troops stationed abroad; commandants and instructors stationed at military academies, and representatives of scientific institutions. Their purpose was to discuss the tactical implications of the 1973 Middle East War, with particular focus on the future viability of armored vehicles on the modern battlefield. Subsequent dis-

¹Col. E. B. Atkeson, "Is the Soviet Army Obsolete?" *Army*, May 1974, pp. 10-16.

²Jeffrey Record, *Sizing Up the Soviet Army* (Washington: Brookings Institute, 1975), p. 48.

³Reporting in *Red Star*, 16 November 1974, p. 1, see also *Military Herald*, No. 1, January 1975, p. 16.

cussions raised doubts about the perpetuation of Soviet offensive doctrine. This conference was followed by an unprecedented second conference in January 1975 at which A.A. Grechko, Minister of Defense and I.G. Pavlovsky, Commander-in-Chief of the Ground Troops strongly emphasized the lessons and implications of the October War, fiercely criticized current Soviet operational exercises, and called for a doctrinal debate on the implications of antitank technology. To date, neither conference has been reported—let alone analyzed—in the West.

Marshal Grechko's comments were incorporated in the second edition of his recent book:

"Combat actions in the Middle East, unleashed more than once in the last 10 years by the aggressive circles of Israel, have put anew the question of the relationship of offense and defense of ground troops, and have disclosed a number of characteristic phenomena in the struggle of offensive and defensive means and in methods of waging the fire battle."

"It is noteworthy that modern defense, in connection with the appearance in troop armaments of powerful firing means, has acquired greater stability. This is being caused first of all by the fact that tanks—the main striking force of the attackers—have become more vulnerable, and the use of them on the battlefield, more complicated. The continuing process of perfecting the antitank weapon has placed before science and technology a serious task in the business of tangibly raising the viability of tank troops and developing more effective ways and means of reliably suppressing antitank defense."⁴

Grechko's provocative comments signalled the beginning of the Soviet antitank debate, and within the last year, Soviet journals have published more than 50 analytical articles discussing the implications raised by the effectiveness of antitank weapons as demonstrated in the Middle East conflict.⁵

While the debate has been mainly confined to the pages of the professional military journal, *Military Herald*, concern over antitank technology is reflected in the increased coverage of the subject in wider-circulation media such as *Red Star*⁶ and *Soviet Military Review*⁷ (the latter published in English). Given the quantity of writings, the high level of

authorship, and the clear expressions of concern, the Red Army evidently feels it has come up against a problem.

However, before NATO embraces the ATGM as a *deus ex machina*, several points arising from the Soviet antitank debate need to be outlined.

- The current Soviet concern over antitank weapons, and particularly ATGM, is not a feature of the last year only, but dates from the Khrushchev period.

- The Red Army has not been putting all of its offensive "eggs" in the tank "basket": the basic trend in Soviet force structure over the last decade has been just the reverse—a scaling down of the tank in favor of other combined-arms elements.

- Ironically, the system the Soviet Army perceives as most threatened by antitank weapons is not the tank, but their infantry combat vehicle—the BMP.

- The Soviet debate over antitank weapons is not really a debate over antitank weapons *per se*—the capabilities and defensive potential of these weapons have been generally accepted. What is being discussed is how to deal with the increased antitank threat while maintaining the Soviet doctrinal preference for the offensive.

Each item above is more fully detailed below.

The Antitank Threat

The Red Army has been long aware of the potentials of antitank weaponry. It was, in fact, one of the first armies to deploy ATGMs in large numbers, and to mount them on armored vehicles. As early as 1964 (upon seeing a firing demonstration of an ATGM against a tank), Khrushchev noted: "It hurt. After all, we were spending a lot of money to make tanks. And if... a war breaks out, these tanks will burst into flames even before they reach the battleline."⁸

Throughout the intervening decade, Russian writers have shown a keen interest in the state of the art in Western ATGM technology. In 1967, Soviet military writers noted "serious changes" resulting from the technological improvements to ATGM: "A qualitatively new method of combating tanks has appeared—the antitank guided projectile, which can destroy any tank at a distance of up to several kilometers."⁹

In 1972, the classical work, *Antitank Warfare*¹⁰ appeared, which paid particular attention to ATGM, noting their significantly greater range and armor-penetrating power in comparison with tanks, their high kill probability, and that under operational conditions, ATGM vehicles could achieve a favorable exchange ratio of four-to-one against tanks and double this against armored personnel carriers (APCs). In 1973, the authors of a book titled, *Tanks*, pointed out that "no little danger for tanks is presented by ATGM."¹¹ Following the Middle East War (but in advance of the current debate), Soviet authors were quick to recognize that: "Guided antitank missiles gave to the infantry that which it never had: the probability of destroying tanks with

⁴Marshal A. A. Grechko, *Armored Forces of the Soviet State*, 2d ed (Moscow, 1975), p. 198.

⁵For instance, Marshal G. Peredel'sky, Commander of Rocket Troops and Artillery has warned: "Combat actions in the course of the Middle East conflict testify that modern antitank defense is the pivot of all defense. It includes ATGM (antitank guided missiles), antitank guns on a tracked base and recoilless guns (as a rule self-propelled), tanks, self-propelled units, BMP (mechanized infantry combat vehicles), grenade-launchers. Now not only each sub-unit has antitank means but each soldier." "The Experience of War—Into Training Practices," *Military Herald*, No. 7, July 1975.

Major General of Tank Troops, I. Skorodumov writes that "more effective methods must be found for combating antitank weapons having various firing ranges—ATGM, grenade-throwers, recoilless guns and helicopters armed with antitank weapons. These have become formidable weapons for use against tanks and other armored vehicles having various armor thicknesses." "An Attack at High Speed," *Military Herald*, No. 3, March 1975.

Lieutenant-General Kontchuck states categorically, "The antitank guided missile projectile (ATGM) is the basic antitank means in contemporary battle. Their combat qualities are constantly being improved: the range of firing is growing, the minimum range of launch is being reduced, and their reliability is being raised by the wide introduction of automation." "The Struggle with Antitank Means in the Offensive," *Military Herald*, June 1975.

⁶For example—see the four-article series by Col. A.M. Latukin "Weapons Against Tanks," *Red Star*, 22 October 1975, 12 November 1975; 4 December 1975, and 13 December 1975.

⁷B. Antsiz "Antitank Guided Missiles in Defense," *Soviet Military Review*, No. 7, July 1975, Lt. Col. Y. Volodin, "Antitank Means in Defense," *Soviet Military Review*, May 1975.

⁸Cited in T. W. Wolfe, *Soviet Power and Europe 1945-1970* (Baltimore: Johns Hopkins Press, 1970), p. 175.

⁹Col. General A. S. Zheltov (ed.), V. I. Lenin and the Soviet Armed Forces (Moscow: Military Publishing House, 1967), p. 264. Col. General Zheltov is head of the Lenin Military Political Academy.

¹⁰Major General G. Bryukov (Artillery) and Col. G. Melnikov, *Antitank Warfare* (Moscow: Progress Publishers, 1972).

¹¹Y. A. Kosyrev, Y. M. Orekhov and N. N. Fomin, *Tanks* (Moscow, 1973).

one shot before the tank could use its own weapons against the infantry."¹²

Soviet Emphasis on Tanks

While the Soviet Union and the Warsaw Pact allies have a decided advantage in tanks *vis-a-vis* NATO, the Soviet Army has not neglected the other combat arms. In fact, contrary to opinions frequently expressed in the West over the last decade, the Soviet Army has actually reduced the importance of the tank in relation to the other combat arms—particularly motorized infantry and artillery. In the early 1960's, the ratio of tank to motorized rifle divisions was 1 to 1.8. By 1974, the Soviet Army had increased by 20 divisions—all motorized rifle—decreasing the ratio to 1 to 2.2.

The increased Soviet emphasis on combined arms has run parallel with the doctrinal shift from "one variant" nuclear war to the adoption of conventional options for the theater forces and was preceded by changes in Soviet ground force organization and command.¹³ In the late 1950s, the Soviet Army was reorganizing to meet what were deemed to be the new demands of nuclear warfare. The artillery branch gave way to the nuclear rocket forces and infantry was de-emphasized in favor of tanks, which might survive on a nuclear battlefield. However, with the conversion of the infantry forces to full mechanization, a rival branch to the tank troops, motorized rifle,¹⁴ was formed in 1963. At the same time, the concept of the "offensive in depth," which emphasized mechanized infantry, was re-instated.¹⁵ This had been developed by Tukhachevsky in the 1930's, but purged by Stalin. In 1967, the Soviet Army brought back the position of Commander-in-Chief of Ground Forces with the appointment of I.V. Pavlovsky, who had been in charge of the buildup of Soviet motorized infantry forces on the Chinese border. In the same year, the Soviet Union conducted her first exercise emphasizing conventional rather than nuclear combat, and from then on numerous Soviet writers have stressed the importance of ground force arms other than tanks. There was even the suggestion that the tank divisions be merged with motorized rifle divisions.

Contrary to Western expectations and predictions, it took the Soviet Union 15 years to deploy a new main battle tank in Central Europe following the introduction of the T-62. (This is the T-72 which is now undergoing initial deployment.) Yet, over the same period, she designed, developed, and deployed five major battlefield air-defense systems, five major artillery systems and numerous armored personnel vehicles—in particular the BMP. Unlike its Western counterparts or previous Soviet models, the BMP is not just an "armored taxi," but wields considerable firepower. This is not only for use against infantry and other armored personnel carriers, for the BMP also contains three systems for combating tanks; an ATGM, a turret-mounted 73-mm anti-

tank gun, and at least one RPG-7 antitank grenade launcher, carried by a trooper inside.

This emphasis on combined arms is also reflected in the buildup of Soviet forces in Central Europe over the last 5 years; for while the Soviet Union has increased the number of her tanks in East Germany, artillery, logistics, antitank, and air-defense capabilities have been increased by larger margins.¹⁶

Soviet Motorized Infantry are More Vulnerable than Tanks

The threat to the Soviet combined-arms buildup is of major importance in relation to the new Soviet antitank debate. What is clearly illustrated in recent Soviet writings on antitank weapons is not so much concern over the survivability of the tank, as of the operational viability of motorized infantry. The army had previously assessed APCs to be twice as vulnerable as tanks. Apparently, in exercises and field tests since the Middle East War, the army has found that the BMP is even more vulnerable to the new generation of antitank weapons than was previously believed. Yet Soviet writers recognize that the success of a conventional offensive is highly dependent upon the protection and mobility of motorized infantry. Until recently, the army assumed that the infantry, mounted in combat vehicles and with the support of massed indirect fire artillery, could overrun NATO defenders, and thus maintain a high rate of advance. However, recognition of the increased vulnerability of the BMP to antitank weapons starts a chain reaction which seems to threaten the entire structure of Soviet offensive doctrine.



If BMP are significantly more vulnerable than the tanks they are accompanying, they may be destroyed at a much faster rate; the infantry may then have to dismount in order to carry out the attack on foot, which makes the infantry more vulnerable.¹⁷ Since infantry on foot are much slower than tanks, the tanks either outrun the infantry and arrive at the defenders' line unescorted, or they must reduce their

¹²Col. N. Nikitin, "New in the Struggle with Tanks," *Banner Carrier*, May 1974. See also Col. Nikitin and Col. S. Petrov, "Israel Aggression in October 1973," *Military History Journal*, November 1974.

¹³See John Erickson, *Soviet Theatre-Warfare Capability. Doctrines, Deployments and Objectives* (Monograph), March, 1975; and his *Soviet Military Posture and Policy in Europe* (Stanford Research Institute, 1974).

¹⁴I. S. Lyapunov, "Motorized Rifle Troops," *Bolshaya Soviet Encyclopedia*, 3d ed., 1970.

¹⁵A. B. Kadisher (ed.), *Questions of Strategy and Operational Art in Soviet Military Work 1917-1940* (Moscow 1965). See also Col. P. Matronov, "Offensive Battle in Depth," *Soviet Military Review*, October 1970.

¹⁶Erickson, *op. cit.* See also John Erickson, "Soviet Military Capabilities in Europe," *RUSI*, March 1975, R. Meller, "The Intensive Re-equipment of Warsaw Pact Forces Since 1969/70," *International Defense Review*, April 1975; and testimony of General A. J. Goodpaster, "To Consider NATO Matters," during a hearing before the Joint Committee on Atomic Energy, Ninety-third Congress, 19 February 1974.

¹⁷"When nuclear strikes on the front edge are not used, a battalion breaks through the enemy's defenses, as a rule, on foot. This is explained by the fact that modern defenses are saturated with great quantities of antitank weapons and engineer obstacles, having high resistance to fire or artillery and aviation strikes. . . On foot, however, the automatic riflemen, machinegunners and grenade-throwers will be subjected to withering fire from all types of enemy artillery units, small arms and anti-infantry mines." Lt. Col. V. Pishakov and Major L. Kirpach, "The BMP in Battle," *Military Herald*, No. 6, June 1975.

REDUCE YOUR BUDGET, YET BUY MORE

by Captain Edward A. Bryla

Whether you like it or not, your ability to hit a target is a matter of budget control. I use this rather ambiguous term because it serves to explain tank gunnery quite well.

The fire control system of every tank has an "error budget." In simple terms, it is the summing up of the imperfections of the components (mechanical and human) of a tank that influence its accuracy. If you had a zero error budget, you would hit the target every time you fired.

The error budget of a tank is an extremely important tool to tank designers and developers. It serves two purposes. First, it tells them what fire control componentry is necessary to provide the accuracy that the Armor community has asked for. Second, it tells them how much the Armor community has to pay to get that accuracy. It allows them to identify the contribution of every facet of fire control and to put a price on each.

Some of the components of a tank's error budget are:

- Fixed Jump
- Jump Variation
- Range Estimation
- Observation of the Center of Impact of Zeroing Rounds
- Estimation of the Center of Impact of Zeroing Rounds
- Cant
- Site Angle
- Gun Laying

These variables are by no means the complete error budget of a tank's fire control. The list above has been

selected in order to identify the part of the error budget that we can at least attempt to control through training and personnel policies.

Each error budget component reduces your chances of hitting a target. For some, the toll they take varies with range; for the remainder, it is constant at all ranges.

Our training and personnel policies could, at no cost, provide increases in accuracy of a magnitude greater than that which a sophisticated piece of equipment such as a wind sensor or propellant temperature sensor could provide.

To increase our accuracy by training and/or personnel policies, we must identify what effect the components of our particular system's error budget have.

Although the following table was constructed primarily with first round shots in mind, most of it is just as applicable to subsequent rounds. Increasing crew skill at sensing is, however, especially significant in increasing our ability to hit and kill longer range targets with the fewest possible shots. We can significantly increase the accuracy of tank gunnery through training and personnel policies, even before we have to consider expensive, sophisticated fire control items.

It should be noted that many of the error sources we have to contend with are directly dependent upon zeroing our tanks. Unfortunately, this also happens to be one of the most neglected aspects of our tank gunnery training.

ERROR BUDGET COMPONENT	CAUSE	CONTROL	REASON
Fixed Jump	The net result of unknown combinations of errors which are present at all firings and are constant for a particular vehicle, gun, and ammunition lot. It is usually assumed that this error source is fully corrected by zeroing.	<ul style="list-style-type: none"> - Increase crew skill at zeroing. - Improve zeroing techniques. - Stabilize crews to the extent practical. - Gunner selection. - Tank Commander selection. 	<ul style="list-style-type: none"> - To insure that its effects are removed by zeroing. - Effect may vary with crews as it does with vehicle, gun and ammunition.
Jump Variation	The residual error which exists after fixed jump error has been corrected.	<ul style="list-style-type: none"> - Same as above. 	<ul style="list-style-type: none"> - Same as above.
Range Estimation	The error in estimating or measuring the target's range. It varies by type of ranging device used.	<ul style="list-style-type: none"> - Increase crew skill at using ranging device. - Tank Commander selection. 	<ul style="list-style-type: none"> - Reduce error per ranging device used. Applicable to those rangings which are relatively close to the correct range. - Reduce instances of grossly incorrect rangings. - This is especially significant with the laser rangefinder.
Cant	The error due to firing from uneven terrain.	<ul style="list-style-type: none"> - Increase crew skill at identifying firing positions. - Driver selection. - Tank Commander selection. 	<ul style="list-style-type: none"> - Reduce the instances and degree of uneven terrain when firing. Result would be a reduction in uncorrected cant for those vehicles without cant sensors and a reduction of the correction required for vehicles with cant sensors.
Site Angle	The error due to differences in elevation between firing tank and target.	<ul style="list-style-type: none"> - Same as above. 	<ul style="list-style-type: none"> - Reduce the differences in elevation.
Gun Laying	The error due to the sight/gun not being correctly pointed at the required aim-point.	<ul style="list-style-type: none"> - Increase crew skill at gross and fine gun laying. - Increase crew skill at estimating lead. - Gunner selection. 	<ul style="list-style-type: none"> - Examination of the pattern of shots fired at an aimpoint finds the vast majority of hits clustered around the aimpoint.
Observation of the Center of Impact of Zeroing Rounds	The error due to the limitations of a human to estimate where zeroing rounds strike.	<ul style="list-style-type: none"> - Increase crew skill at sensing. - Improve zeroing techniques. - Gunner selection. - Tank Commander selection. 	<ul style="list-style-type: none"> - Zeroing is used to remove fixed error sources from the system.
Estimation of the Center of Impact of Zeroing Rounds	The error due to the limitations of a human to remember where the zeroing rounds struck and to determine the center of the shot group.	<ul style="list-style-type: none"> - Improving zeroing techniques. - Gunner selection. - Tank Commander selection. 	<ul style="list-style-type: none"> - Same as above.



The New West German Luchs



by Captain (Retired) Edwin W. Besch

The *Luchs* (*Lynx*) Armored Reconnaissance Scout Vehicle (ARSV) represents the best technology available today for a vehicle of its type. It was preceded by a long development history of eight-wheeled armored vehicles in Germany. As early as 1927, the German Reichswehr Ministry issued requirements which resulted in three eight-wheeled and one 10-wheeled armored vehicle prototypes being produced by 1929. One of these, designed by Daimler-Benz, under the direction of Professor Ferdinand Porsche, had eight driven wheels and a self-supporting, amphibious hull.

Although the Germans, in 1935, adopted an armored car based on a truck chassis due to lower costs, the Buessing-NAG firm began development of a new 8 x 8 armored car which was comparable to a light tank and entered service as the *Sonderkraftfahrzeug* ("special purpose vehicle") *Sd. Kfz. 231* heavy reconnaissance vehicle. An improved version, the *Sd. Kfz. 234/2 Puma*, armed with a 50-mm high velocity gun and fitted with a V-12 diesel engine, is considered by experts to be the most effective armored car used up to the end of World War II. The success of the

Puma ultimately influenced the design of the *Luchs*.

Development and Production

Development of the *Luchs* began with initial design studies in 1962 as part of the Bundeswehr (West German Army) program to develop a whole range of wheeled military vehicles using commercially standardized components. The Daimler-Benz firm and a joint design bureau representing the firms of Buessing, Kloeckner-Humboldt-Deutz, Krupp, Maschinenfabrik Augsburg-Nuernberg, and Rheinstahl-Henschel built the first competitive prototypes in 1968. A total of 19 prototypes, incorporating four different engines and two different suspension systems, covered over 260,000 kilometers during several development phases and testing which took place in West Germany, Norway, and Sardinia. During 1971, the Daimler-Benz design was selected for final development, and in December, 1973, Rheinstahl was selected as the prime contractor. Series production of the *Luchs* began at Rheinstahl Wehrtechnik, Kassel, West Germany during early 1975 and will continue through the fall of 1977 at a rate of up to 20 vehicles per month.

The first two *Spaehpanzer 2 Luchs* (*Lynx*) 8 x 8 ARSV's to be assigned to a reconnaissance unit were delivered to General Hildebrandt, West German Army Chief of Staff, during a ceremony on 4 September 1975. Several vehicles had already been delivered to Army schools as early as May 1975. The *Luchs* vehicles are replacing 18-year old, French-produced *Hotchkiss SPZ 11-2* tracked ARSV's in West German Army divisional reconnaissance battalions. A total of 408 *Luchs* vehicles, at a cost of approximately \$293,000 in 1975 dollars, excluding spare parts, will be produced for 11 battalions, army schools, and war reserve stocks by late 1977.

The West Germany Army chose an 8 x 8 vehicle design for its ARSV due to lower manufacturing and operating costs, faster road speed, longer range, and quieter operation than a tracked vehicle can offer while providing nearly the same cross-country mobility as a tracked vehicle. The *Luchs* provides West German Army divisional reconnaissance battalions with adequate firepower for the scouting role, excellent observation capability, powerful communications, excellent road and cross-country mobility, amphibious capability without preparation, quiet operation, relatively easy maintenance, and effective armor and CBR protection. It operates alongside *Leopard* 105-mm gun main battle tanks, which are also organic to divisional reconnaissance battalions and can provide heavy fire support when needed.



Armament

The *Luchs* is adequately armed for the scouting role, mounting a dual-feed *MK 20 DM-5* (Rheinmetall *Rh-202*) 20-mm automatic cannon and coaxially- and roof-mounted *MG-3A1* 7.62-mm machineguns in and on the Rhein Stahl *TS-7* turret. The 20-mm cannon can be used to effectively engage lightly-armored vehicles at ranges up to 1,000 meters and area targets, low-flying aircraft, and helicopters at up to 2,000 meters. An infrared/white light searchlight and eight smoke-grenade projectors are also mounted on the turret. The turret can be retrofitted with the *FN 4-15* vehicle navigation system which uses a digital computer for continuous determination of vehicle position. The *Luchs* is manned by a four-man crew: driver, gunner, commander, and radio operator/rear driver, who sits behind the engine, facing rearward. The crew uses passive night vision devices for observation, fire control, and driving; and three radios; *SEM-25*, *SEM-35*, and the 400-watt HF set provide excellent communications.

Mobility

The *Luchs* is powered by a Daimler-Benz *OM 403 VA* liquid-cooled, multifuel, 10-cylinder, four-stroke cycle engine with direct fuel injection and two exhaust turbochargers. The engine delivers 396 horsepower at 2,500 r.p.m., using diesel fuel; and 360 horsepower, using gasoline. Oil-

preheating and a cold-starting device have been added for starting at extremely low temperatures and to avoid the formation of white smoke during warm-up. The engine is coupled to a hydromechanical four-speed transmission with a torque converter with lock-out clutch. The entire power pack is quickly removable, and suppression of engine noise and infrared signature was stressed during design of the exhaust system. The eight powered, steerable wheels are suspended by large vertical coil springs and hydraulic shock absorbers from Daimler-Benz rigid outboard epicyclic axles.

The *Luchs* is the first armored vehicle designed for amphibious operation to enter service with the West German Army. Hydraulic cylinders can be used while the vehicle is moving to erect the bow vane which prevents the vehicle from nosing in when entering the water. Two rear-mounted, steerable five-bladed propellers give the *Luchs* a top-speed of 10 km.p.h. in water. A low freeboard limits amphibious operation to relatively calm inland waters.

Protection

The *Luchs* has a monocoque hull constructed of welded steel plates to provide optimum armored protection consistent with buoyancy and minimum weight requirements. Plastic foam-filled steel boxes between the wheels provide a spaced armor effect on the lower sides and add buoyancy when the vehicle is afloat. Its self-sealing fuel tanks are designed to seal penetrations of tumbling projectiles up to 12.7-mm, and an elaborate fire extinguisher system has been installed. CBR collective protection is provided by filter and overpressure systems.

Despite numerous experiments with eight-wheeled armored vehicles in a number of other countries, including the United States, only five eight-wheeled armored vehicles, in addition to the *Puma* and *Luchs*, have been adopted. These are the Austrian *ADGZ* armored car, of which only 52 were produced during the mid-thirties, the French *EBR* armored car, which entered service in 1951; the Dutch *YP-408* 8 x 6 armored personnel carrier (APC) which was developed during 1956-7 and produced from 1964-8;

the Soviet *BTR-60* series of APC's, which entered service in 1961; and the Czech-Polish *OT-64* APC, which appeared in 1962. Of these, the *EBR* will be replaced by the *AMX-10RC* 6 x 6 armored reconnaissance vehicle in 1977; the *YP-408* was replaced in first-line Dutch mechanized units by U.S. *M-113* tracked APC's; and the *BTR-60*-series and *OT-64* APC's are being replaced in Warsaw Pact Armies by the *BMP* tracked Amphibious Armored Infantry Combat Vehicle. A number of 8 x 8 armored vehicles designed during the last decade have not been adopted. These include Chrysler Corporation's Special Warfare Armored Transporter (1966), Lockheed's *XM-808* Twister Combat Vehicle with articulated body (late sixties), French *Panhard M-8* APC and antitank vehicle prototypes (early seventies), and the 8 x 8 version of the Swiss *Mowag Piranha* APC (mid-seventies). Continued improvements in suspension systems, engines, power trains, and tires will probably increase the trend toward smaller, less costly 4 x 4 and 6 x 6 armored vehicles and make 8 x 8 designs, like the *Luchs*, expensive anomalies despite their comparability with tracked vehicles.



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MANSTEIN'S WINTER MIRACLE

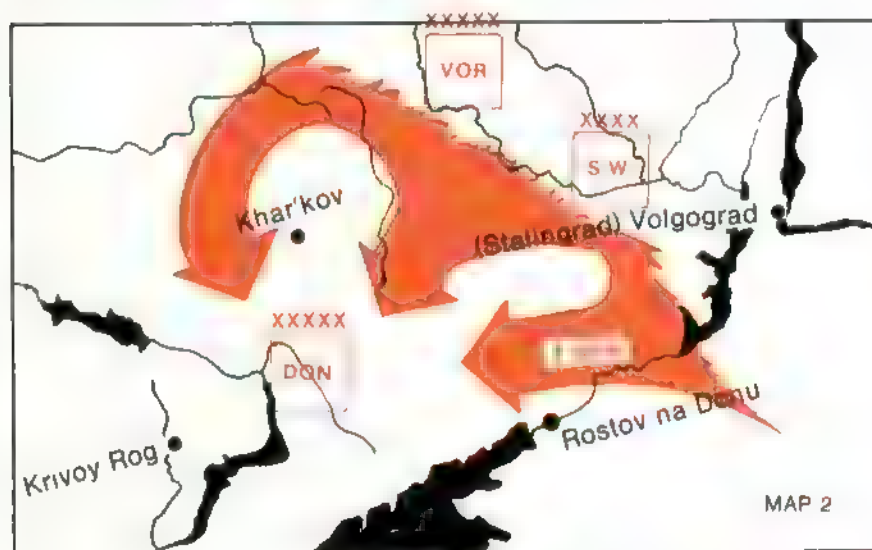
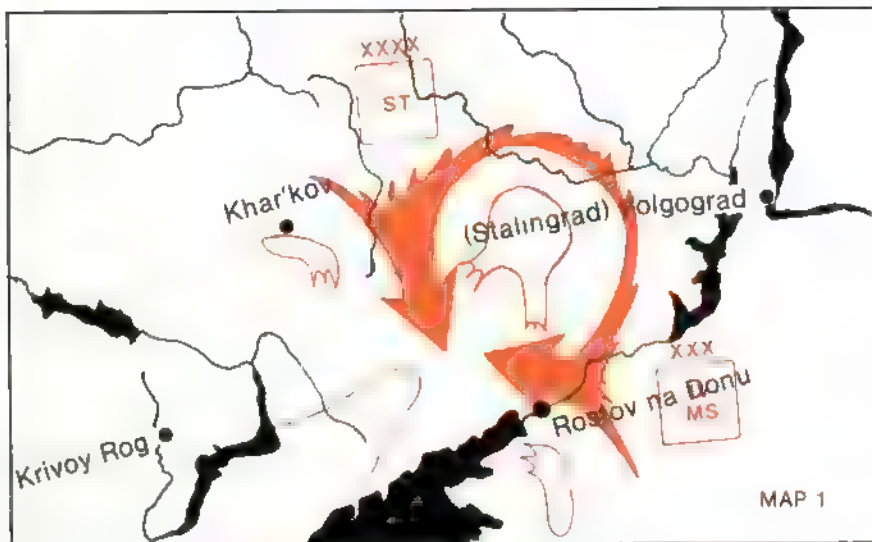


by Captain Ronald J. Brown

From January to March of 1943, one of the most amazing campaigns in the annals of military history took place. The Soviet Army had just annihilated an entire Wehrmacht Field Army at Stalingrad. The Red Army, exhilarated by its smashing victory, turned its attention to the battered and over-extended units of Field Marshall Erich von Manstein's Army Group Don, located between the Donets and the Dnieper Rivers in the Don Basin. Manstein's forces were badly outnumbered and poorly positioned to parry any new thrusts by the Russians. Strong Soviet armored formations were beginning to pour through the huge gap left by the collapse of the Axis lines south of Stalingrad (map 1). Josef Stalin saw his chance to dwarf the mighty victory at Stalingrad. The outcome seemed certain, the Wehrmacht's exhausted troops appeared doomed. Yet, 3 months later that terrible German defeat at Stalingrad had been avenged. The Red Army was reeling back in defeat, suffering immense casualties and material losses. Manstein restored the front lines of the previous year. This stunning victory, in spite of impossible odds, was Manstein's "winter miracle of the Don."

Although this battle ended 30 years ago, its lessons are still applicable today. Mainstein's plight bears a striking similarity to the situation of modern commanders in Western Europe. Today's leader can apply some of Manstein's solutions to better deal with current threat forces and their doctrine.

Manstein had three immediate problems to overcome in January of 1943. First, his Army Group was poorly located to meet the Soviet threat. The futile relief attempts left Army Group Don strung out along a 100-kilometer axis. A Soviet pincer operation crushed the Rumanian Armies holding Stalingrad's flanks. Fresh Russian armored formations were pouring through the resulting gap. Second, the Red Army enjoyed a tremendous numerical advantage. The Soviets outnumbered the Germans by a 7 to 1 margin; 3,300 tanks to 495 panzers. (In fact, one Red formation, the 3d Tank Army, had 900 tanks itself.) The Soviets mustered 179 artillery pieces and 48 armored fighting vehicles (AFVs) per kilometer of front. Man-



with a three-pronged attack. His 2d Guards Army was to attack west along the River Don, capture the key city of Rostov, and separate Army Group Don from the 1st Panzer Army. The Southwest Front was to drive to the Sea of Azov, cutting off any force behind the Muis River and act as the right-hand pincer to isolate and encircle Army Group Don. The last tenacle was to drive down the Dnieper River and complete the encirclement (map 2).

Manstein implemented the first of many sound tactical decisions after a survey of the situation. Ignoring his own safety, he took a calculated risk and decided to deal with each attack in turn. He swiftly dispatched his best panzer divisions south to assist with the crisis along the Don. The forces along this river chose to initiate a series of delaying actions, trading space for time. They would strike suddenly and retreat, defending only key positions, and then only for short periods. The Soviets were kept off balance. Their troops became exhausted, machinery broke down, vital fuel was expended during numerous attacks, yet, headquarters demanded that they push on. As the Soviet strength dwindled, the Wehrmacht's grew. The delay was successful. Elements of the 1st Panzer Army joined Army Group Don in fortifications along the Muis River. By the time they reached this well defended obstacle, the Red Army was sapped of its enthusiasm for battle.

Once the Muis line stabilized, Manstein shifted his panzer divisions to deal with the threat from the center. General Popov's strong armored forces were driving hard for Stalino, a city north of the Sea of Azov. Popov's T-34s easily shattered the thin German defensive lines, and were in hot pursuit of a rapidly fleeing foe. Suddenly, they ran headlong into the fresh 5th SS (Viking) Division. This led to a series of classic "meeting engagements." Column ran into column in these unplanned brawls across the Steppe. It became tank versus tank, man versus man. The tanker with the quickest gun won. This type of free-for-all fight was the German's strong suit. Soon, Popov's advance was halted. The 5th SS grabbed the big bear's nose, and now the 11th Panzer kicked his tail. German formations from the Muis line had arrived. They quickly enveloped Popov's spearhead. The battle of the

stein had nothing to match these numbers. Finally, the Soviets had a definite qualitative advantage. The T-34 and KV II tanks were far better than the obsolete panzers they faced. The T-34's sloped armor and 76-mm gun made it a potent foe. Its wide tracks and high horsepower to weight ratio gave it excellent off-road capabilities. The Wehrmacht's panzer III and IVs were sadly obsolete by this time, saddled as they were with inadequate main armaments, poor cross-country performance, and paper thin armor. Tank for tank they were no match for the Russian armor. Their only advantage was the excellent radios mounted in each tank. The ugly Russian winter (temperatures often dropping to $-30^{\circ}\text{C}.$) played no favorites for either side.

Manstein quickly realized that he could not meet these superior forces with conventional tactics. Rather than

fight for each foot of ground, he turned to a mobile defense. He made masterful use of Liddel-Hart's concept of the "indirect approach." Time and time again, Manstein offered tantalizing targets to the Red Army. When the Soviets leaped at an irresistible bait, the Wehrmacht would roll with the punch—then suddenly strike a "back hand" blow at an unguarded flank. Manstein carefully conducted these attacks to coincide with a logistics failure, an exhausted unit, or an isolated formation. One division, the 11th Panzer, became so adept at these maneuvers that they were soon called the "Ghost Division." These tactics maximized the German strength and negated the Soviet superiority.

Stalin's intention was to cutoff and annihilate all the Axis forces in the Caucus and Don Basin Regions. He wanted to steamroller the Germans

center was over. The Germans captured or destroyed 145 T-34s and 267 other AFVs.

Manstein's crowning achievement was yet to come, however. He decided to deal with the Soviet left wing using a ruse. He offered a target so tempting they dared not refuse—his own headquarters. Manstein cleverly left an obvious gap in his defenses. A segment of the defensive line was manned by the weak and "tank frightened" Rumanian Army. STAVKA, Stalin's supreme headquarters, quickly exploited this weakness. The Rumanians were quickly overrun. At this same time, General Hausser's SS Panzer Corps was forced out of Kharkov, a direct violation of Hitler's specific orders. This led STAVKA to insist the Germans were on their last legs. The 6th Army was ordered forward as quickly as possible to cut off any escape routes. This was precisely what Manstein wanted! While the Soviets were rushing ahead at a furious pace, he was shrewdly gathering strength. Hausser's II SS Panzer Corps waited on the left, while the 48th Corps lurked in ambush on the right. The Russian onslaught carried them deeply into the trap. They began to run low on needed fuels and ammunition. Troops that were on the move almost constantly since the isolation of Stalingrad became exhausted. The time was right. Manstein's two forces struck out of the swirling snow. The 25th Corps was quickly sealed off by the panzers. The Soviets suffered heavy casualties: 251 tanks lost, 125 antitank guns and 73 artillery pieces destroyed or captured, and 3,000 dead. The Soviet Sixth Army fell victim to a similar strike between Manstein's forces suffering the loss of 615 tanks, 423 guns, 600 antitank weapons, and 23,000 dead. The Third Tank Army was belatedly sent in to bail out the Sixth Army and was totally demolished. Manstein had stemmed the Red tide.

These losses left wide gaps in the Soviet lines. Manstein's panzers quickly switched from defense to offense. Cities that were so hurriedly abandoned 3 months prior now fell like ripe fruit. Kharkov was reoccupied on March 15th and Belgorod fell on the 18th. The Soviet Southwest Front lost 6,000 square kilometers in a single week. The tables were exactly reversed. Now, the Russians were on the brink

of collapse. Their losses were grievous: 1,400 tanks, 3,000 guns of 76-mm or larger, 50,000 killed and 20,000 missing in action.

The Russian savior was "General Rasputia." No, Rasputia was not a hero of the Soviet Union. Rasputia is the annual spring rains that bring the thick, sticky mud to the plains of the Ukraine. The German offensive bogged down just as it had on the road to Moscow the previous winter. Manstein's miracle of the Don Basin was over. Unfortunately, this impressive campaign was not decisive. Hitler took advantage of the spring respite to rebuild his army. The Wehrmacht's armored forces were reorganized, re-equipped (with *Panthers* and *Tigers*), and given new leadership (Colonel-General Heinz Guderian). The Fuehrer then wasted this "new army" in a futile assault on the Kursk Salient. Manstein showed the potential of a mobile defense and the soundness of the indirect approach, yet, Hitler ignored all these lessons. He violated every princi-

"The fight for the Don Basin was marked by brilliant German leadership at all levels, from Army Group to squad."

ple and insured his own final defeat.

These battles in the Don Basin were as much "battles lost" by the Russians as they were battles won by the Germans. There were three glaring weaknesses in the Soviet system: a rigid, inflexible command system; the lack of an effective, rapid communications system; and a poor logistical process.

These three factors resulted in the heavy handed, unresponsive tactics that gave the Wehrmacht the upper hand. The Soviet command system allowed for no deviation from the prepared script. Doomed attacks were carried out even though their futility was apparent to all on the scene. Subordinate commanders were mere automatons, only echoing their orders from above. Individual initiative was stifled, and only complete compliance was tolerated. This sterile atmosphere was compounded by the fact the Russians were never able to implement an effective, rapid communications system that

could operate on a tactical level. Even in the elite Guards units, individual vehicles (other than command types) never had radios installed. Lacking such a system, they often had to commit entire units to accomplish simple tasks.

The major limiting factor, however, was logistics. The Soviets never developed a logistical system that was responsive to the tactical commander. The reverse was true throughout the Great Patriotic War (GPW) although the commander was limited by his supply system more than any other western army. The Red Army used two techniques to overcome their difficulty. One, they loaded their carriers with as many supplies as possible. This had two major drawbacks. The storage of outside fuel tanks made AFVs very vulnerable to infantry fire. The other problem was that the entire supply tended to be used up quickly in an engagement.

Secondly, the combat arms would travel in two echelons, each with a specific task. When the lead units ran out of supplies, the second echelon merely leap-frogged ahead until they ran out. This system was impractical unless an extreme numerical advantage could be attained and maintained.

It appears that, even today, exactly the same problems plague the modern Red Army. The tactics of the GPW still rule the roost. Little is done to foster leadership at lower levels. (In fact, the Soviets still use only one NCO per squad, a system the U.S. Army dropped after the Korean War in favor of the fire team concept.) The Soviets still need help in establishing effective tactical communications. Many MBTs in reserve units still have no radios. The modern Soviet armored division operates only 900 radios, while a similar U.S. armored division (with attachments) may use up to 3,000. Much of this problem is due more to a maintenance gap than to a technological gap. Soviet radios are maintained in separate units, rather than issued to using units as are ours. All these problems contribute to a U.S. superiority in communications.

The Russian logistics problem still exists and the two echelon formation is still used by assault troops. T-62 tanks are still stuffed with supplies and, in fact, still have outside fuel drums. Russian doctrine calls for their spearheads

to push forward as fast as possible, moving constantly, around the clock until their objectives have been secured. Since a T-62 can use up its ammunition allotment in a matter of minutes and its fuel in a few hours, this doctrine may run afoul of the logistics problem. Even today, with the increased logistics needs, the Soviets only allot 580 men per 1,000 for distributing "beans, bullets, and band-aids." (The U.S. has 3,285 per 1,000.) No one can accuse the Soviets of being "tail heavy," but there is some question as to the effectiveness of its supply system.

On the other hand, Manstein's plan German's strongest point, leadership. The fight for the Don Basin was marked by brilliant German leadership at all levels, from Army Group down to squad level. Time and time again, junior leaders assumed responsibilities far above their commensurate rank. Manstein attributed the defense of Rostov to the actions of a single lieutenant, 1st Lt. Klappich, who without orders from above, gathered an *Ad Hoc* combat group of battalion size and held the key bridge at Samodurovka, buying needed time to organize the defenses of that city.

The German command system neatly meshed strong central control with individual initiative at tactical levels. This seeming contradiction was achieved by a single proviso. The Wehrmacht's chain of command went from the front to the rear. The staff at headquarters was expected to anticipate problems and have solutions ready when requested. The staff handled the everyday affairs at headquarters. The leader's position was at the front. Commanders went to the action and made their decisions based on personal observation, not at a rear headquarters as did the Soviets. Army Group Don assigned missions but did not get involved in execution. While at the front, Manstein observed but did not meddle. He accomplished the basic task of all leaders, he was seen and heard by his troops. They saw him share the risks and learned to trust his judgement in a crisis. His example was carried down to all levels.

Leadership by example has its risks. The number of leaders that needed to be replaced (due to wounds, death, transfer, or promotion) can be astronomical. A leader that is not up to

the task must be quickly identified by personal observation and relieved. There must be a competent leader ready to take his place or the system will fall quickly into chaos. There is likely to be a high turnover of personnel. Men will be called on to command units larger than their rank indicates. The 6th Panzer Division is an excellent example. It entered the Don Basin at full strength in January. By March, its 13 battalions were commanded by 1 LTC, 5 Majors and 7 Captains; 52 companies were commanded by 29 Captains and 23 Lieutenants. One of the division's leaders, Dr. Bake, rose from lieutenant to general in the 6-year period of World War II.

The leadership lesson is crystal clear. Today's Army must train its leaders to rise above their current level rapidly. The German Reichwehr, predecessor of the Wehrmacht, trained all its members to quickly assume higher positions. Captains were able to command regiments and section leaders could command companies. Our officer training and NCO schools must be grueling tests that can weed out the inefficient and the unmotivated. Once out with their units, they should be given guidance and challenges. We must not let them become robots that merely regurgitate orders from above. We must let them develop confidence and pride and observe them, but not meddle. We need to learn who can be trusted in tight spots. This is how we create leaders who can meet any challenge.

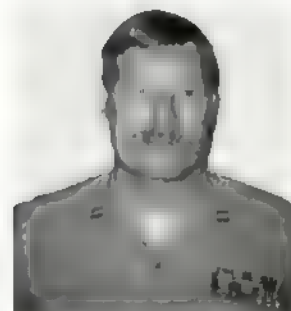
Today's Army also needs a firm, jointly agreed-on antitank doctrine. A sound combined-arms approach can defeat any enemy threat. In the Don Basin, the 11th Panzer and 336th Infantry divisions worked together to destroy 157 Soviet tanks without loss (both divisions combined had only 24 tanks) in 5 days. This doctrine must be understood and practiced by all branches. It should take into account that modern weaponry makes every individual soldier a potential tank killer. The system must be flexible enough to operate on all kinds of terrain and in all climates.

Finally, it must achieve decisive results, the enemy must be rendered incapable of further action. Remember Guderian's "*Klotzen, nicht Klerken*" which translates "Mass, not dribbles." These were the kinds of things that

Manstein accomplished in the winter of 1943.

How can we put such a doctrine into practice? By a standardized training program at all branches, lots of field work, and Command Post Exercises. Once again, the Reichwehr experience comes in handy. All of the major battles of World War II had been previously fought by the German General Staff! They were fought at war games in the 1930s. Similar games should be run with this new doctrine, including members of all branches. At the tactical level it is possible to war game as well. Games similar to the professionally published *RED STAR-WHITE STAR* could be developed by the branch schools and distributed to the various commands. They are simple to play, involve one or more players, and are easy to handle. They can be made realistic enough so the player using correct techniques will be the winner. The competition results in a better challenge than a map exercise or repetitious tactics lecture. Learn by doing. These are some possible solutions for today's Army.

Manstein's Miracle of the Don (in the words of Liddel-Hart) "proves the extraordinary resisting power inherent in modern defense so long as the commanders and the troops keep cool heads and stout hearts." Let us ensure our side will have such cool heads and stout hearts if the need arises.



CPT RONALD J. BROWN, USMCR, graduated from Western Michigan University in 1967 and served in the Marine Corps on active duty in Vietnam in 1968-69. A former Infantry platoon leader and rifle company commander, he also served in several staff positions. Captain Brown, a class III reservist, is currently a high school teacher and football coach in Detroit, Michigan.

Page from the Past

TEAMWORK

Teamwork is essential to success in battle. A reconnaissance unit must not only have teamwork within itself, but should be a member of the division team; and, as such, it should be equipped and trained and commanded by the officer who is primarily responsible and concerned with its ability and performance. No squadron taken at random from Corps or Army Cavalry, or improvised can perform so effectively its mission as a squadron could which would be a part of the division and specially trained to work with it.

It is not believed that the divisions can rely solely on the Corps or Army Cavalry for their reconnaissance, especially at the beginning of any war when maneuver will be the rule. This period will probably see rapid marches, concentrations, seizure of advanced positions, meeting engagements, and delaying actions in which the divisions may be acting independently. Even if they are grouped as part of a corps they may be so dispersed and the gaps so great that in fact they are operating alone. Under such circumstances it will be imperative that each division have its own Cavalry reconnaissance squadron.

The Cavalry Journal
January-February 1936

INVITATION TO DISASTER

Should our enthusiasm for the novel and the mechanical carry us too fast, we might conceivably find ourselves in the situation of the lobster who, having in his haste for new glones sloughed off his old armor, finds himself forced to seek the seclusion of some rocky cave until his new plates have hardened. A cave for a nation of our size is hard to find, and a soft-shelled America might find many with an appetite for its unprotected abundance.

The Cavalry Journal
January 1924

CADENCE

Those who have marched, dismounted, great distances under trying conditions, know that the rhythmic flow of marching in cadence is restful to the fatigued mind and body. The visible concordant swaying of the shoulders and the cadent tread of the feet is harmonious, it is soothing to strained nerves. It gives a tired outfit a refreshing "lift," especially when accompanied by melody—be it song or martial music. It is comparable to horse leading after a long period in the saddle, or a change of gait that has been excessively long. Many can remember on occasion how one "dumb john" being out of step in a tired unit became so discordant and irritating that personal antipathy toward that particular individual was inherently general.

Marching in step, like dancing, serves a practical purpose. Those who are athletically or musically inclined instinctively feel cadence; others can acquire it by practice. Whether in rank or not, men, therefore, should form the habit of walking in step. This obviously is worthy of the consideration also of hiking clubs and semi-military organizations whose members include prospective trainees. It is a military training factor.

Cadence is a military differential.

The Cavalry Journal
January-February 1941

CAVALRY MISSIONS

The mobility of an army, the freedom from interference of its marching columns, depends upon the cavalry which precedes it, envelops and protects it, and forces a passage for it through the enemy's outlying detachments. The cavalry, if properly handled, will explore the territory in front of the army. By fighting mounted, as well as dismounted, it will drive away the hostile cavalry. It will discover and make fruitless the enemy's attempts at ambush. It will seize and hold strong points in advance. By fire action it will hold up and delay the enemy's march. It will force his premature deployment. When conditions are suitable, it will execute great raids into the enemy's country, raids of armies of mounted riflemen, interrupting the enemy's communications, his mobilization, capturing his depots, his outlying detachments, placing him on the defensive, forcing him to retreat. That these things have been done will be done, is shown by history.

The Cavalry Journal
July 1928

MOBILITY

A quail is not doomed to death because he has no armor, neither is a destroyer. An armored car with cavalry is a land destroyer.

There is no gainsaying the fact that an inch and a half of steel all around would be comforting. A No. 2 field range would also be most handy to a cavalry soldier caught at meal time far from camp. Both are—unattainable comforts and for the same reason—weight.

To add further emphasis to a point apt to arouse controversy and also to accede to our national penchant for voting, it is confidently asserted that if men who have fought tanks in action were asked to voice an opinion, they would willingly dispense with 50 percent added protection in order to secure 5 percent added mobility.

The Cavalry Journal
January 1924

AIR REECE

The strategic reconnaissance by air-machines must stand constantly in close relation to and in direct connection with the reconnoitering cavalry, because the very information the air-machine obtains will facilitate the work of the cavalry in clearing up for it doubtful points. Otherwise, time and energy will be wasted. In this respect the work of air-machines is particularly valuable, inasmuch as they can float at ease in certain localities, readily changed from time to time, and remain secure in quiet observation. To be of use in this way, however, they must always be available when needed.

The Cavalry Journal
November 1910

ANIMALS IN WAR

Much has been written about the modern machines of war—and rightly so, but man has not yet made the machine that can replace the foot soldier or the pack mule. And with equal force it may be added, the pack artilleryman and the American cavalryman. The foot soldier, the pack mule, the pack artilleryman and the

American horse cavalryman with his machineguns and mortars in pack, are the trail blazers who work their way through the inaccessible places and come out with unbeatable combat teams—task forces supreme.

The Cavalry Journal
September-October 1944

COVER DESIGN

Numerous letters from our readers clearly indicate that sentiment is for continuing with the cover design of the Cavalry Journal substantially as it has appeared in recent issues. In other words, the Remington drawing suggests our historical background, while at his feet there is a symbolical parade of modern cavalry as we have it today. So be it!

In this regard, it is believed that the following letter is of interest.

Gentlemen:

Check for \$3.00 herewith for The Cavalry Journal for 1941

By all means NEVER change the cover or remove Fred Remington's famous painting of the U.S. Cavalryman, which is an inspiration to all horse lovers and brings back memories of pioneer days, Indian fights, Pony Express, stagecoach — typical American plainsman, rough, and ready, when soldiering was real work and hardship.

The Cavalry Journal
January-February 1941



Mini-Ranges Pay Big Dividends

by Specialist 5 Jeffrey Stark

A single, multi-faceted subcaliber training complex which includes facilities for a mini-tank range, mini-mortar range and other training aids has been built by the 2d Armored Division at Fort Hood, Texas. The complex also has facilities for an artillery subcaliber range, a *TOW* missile dry-firing range, an *M-72 LAW* subcaliber range, a mine warfare area, a CBR proficiency course, a leadership reaction course, an armored vehicle launched bridge (AVLB) driving course, and a combination standard and armor physical training course.

Looking something like a small baseball park, the mini-tank range accommodates two tanks at a time. The tanks are positioned in a wooden shed which is open at both ends. From where the tanks sit, the crew gets a full view of scaled-down terrain that is surrounded by a wide wall filled with sand.

The subcaliber device used on the range is made from the barrel of a .22 caliber rifle and a few other odds and ends. The barrel of the rifle is mounted coaxially with the tank's main gun tube by using a bracket and clamps. Using an electrical firing mechanism wired through the coaxial machinegun, the .22 caliber round can be fired from inside the turret. Then, by attaching a special range scale onto the subcaliber mount, the crew can operate just as it would in a full-scale operation, including the use of the ballistic computer. The only difference is in the loading procedures and the absence of recoil and obscuration.

The targets, representing miniature tanks, are about the size of a matchbox and are moved mechanically over the miniature landscape by a 1/15th horsepower motor hooked up to a series of pulleys and wires that pull the small tanks around an endless course. Made from a recently developed rubberized plastic, the targets allow a bullet to pass through them without leaving a hole. After the bullet goes through the target, the flexible plastic fills the hole again. Targets made from this material can absorb up to 500 direct hits before they have to be replaced, drastically reducing the cost of maintaining the range.

Provisions for night firing were also invented. By mounting a 6-volt flashlight to the main gun tube and using a paper cone to reduce the beam to a realistic size, the tankers can simulate searchlights.

A mechanism which simulates the firing of a *Shillelagh* missile from the *M-60A2* and the *M-551* has recently been put into operation. This mechanism allows for a delayed firing of the subcaliber device to simulate the missile's time of flight after the gunner squeezes the firing trigger. In order to simulate various ranges, the delay mechanism can be adjusted to fire from 1 to 20 seconds after the trigger is activated to allow for the different times of flight at different distances. This device is also capable of simulating the firing of *TOW* and *Dragon*.

The mini-range for mortars uses the same basic concept of miniature targets and projectiles and can accommodate a platoon of mortar men, using either 81-mm or 4.2-inch mortars.

Other mini-ranges in the complex include a subcaliber artillery range and a subcaliber *M-72 LAW* range. The artillery range uses a battery of *M-31* 14.5-mm artillery trainers that fire small, white smoke-producing rounds at small tanks, APCs, and other targets. The *LAW* range uses the mortar pneumatic devices that have been specially adapted for the *LAW*'s smaller tube size.

Among the advantages accredited to the mini-range complex are:

- Crews can fire more rounds at the targets.
- Crews can immediately see errors and correct them on the spot.
- Savings in fuel and maintenance.
- Savings of time. During a normal, 8-hour training day, tankers who have to train on the full-scale range actually only get to spend about 1/4th the time doing what they're out there to do. After subtracting travel time to and from the motor pools, then getting everybody set up the way they're supposed to be, then an hour for lunch and finally an hour and a half for maintenance and washing of the vehicles, there is not much time to do any effective training. Furthermore, additional time and manpower is lost because of the necessity for target details, safety procedures, and other administrative matters.

On the other hand, because of the proximity of the mini-range complex to the motor pools, travel time is cut to about 10 minutes and maintenance is cut to a minimum. To eat lunch, the men simply walk to their mess hall. The result is a training day with 7 usable hours instead of the 2 or 3 when using the full-scale range.

However, the most convincing argument in favor of the mini-range complex is the tremendous amount of money it saves. A tank crew fires 330 rounds annually during service practice at the cost of \$18,150 per tank. When multiplied by 17 for the number of tanks in a company, then by the number of companies in a battalion and then by the number of armored battalions in the division, the cost becomes slightly more than \$4.5 million. Moreover, since current training doctrine calls for each tank crew to familiarize itself with its weapon about once a month, that \$4.5 million is only a partial figure for annual tank main gun ammunition costs.

By using the mini-range, tankers can reduce the number of service rounds to about 175 or just about half. This effects a savings of about \$2.25 million.

The savings for the other ranges are just as representative. For example, if each crew in a division would use the simulator for just one *Shillelagh* missile, the savings would amount to \$270,000. Mini-ranges pay off, and what division couldn't use an extra \$2.25 million?

NATO Defensive Concepts

by Major A. E. Hemesley
British Army

The reprint of Lieutenant Colonel Tamminen's analysis of a new defensive concept together with the artillery rationale by Colonel Guffey published in *Field Artillery Journal* of March-April 1976 show the continuing interest in a viable U.S./NATO defensive concept. The two articles provoke much thought of a purely professional nature. Without giving a resume of Colonel Tamminen's defensive concept, it is proposed in this article to examine two further factors in the debate, the use of time for deployment and an examination of the likely field of battle. First, however, a brief look at the strategic background is required.

It is generally accepted that the Warsaw Pact will have a military initiative in any future European conflict. Furthermore, as a "flexible response" is the accepted political philosophy, any new tactical concept must fit into that strategic doctrine. Since the battleground for a future conflict is likely to be the territory of a major NATO ally, it is politically imperative that the Main Battle Area (MBA) should be as close to the border as possible. These facts make time the critical factor in establishing an initial defense. Time must be gained to allow deployment of integrated NATO forces.

It is unlikely that military commanders would await formal political clearance before deploying their troops should Warsaw Pact forces cross the border. The employment of tactical nuclear weapons will, however, certainly be delayed until political release has been given. The battle will therefore, in its initial phases, be conventional. This is the much cited "first battle" which NATO must win.

Warning of imminent military operations can be expected from both ground surveillance troops on the frontier and electronic monitoring of Pact communication systems. In addition, a period of political tension may give a bonus time which can be used for deployment. In either case, the new defensive concept must be prepared to face the blitzkrieg operations for which the Warsaw Pact train. The concept must also take into account the relative peacetime grouping and location of the opposing forces, designed for offensive action at short notice.

The result of political and geographical limitations on NATO commanders is to present a battle scenario where they will have to fight a conventional battle, outnumbered, and after only a short deployment time. At this stage, an examination of both the enemy's tactics and the likely battlefield is appropriate. Implicit in all Colonel Tamminen's conceptual development is that the battlefield will be open in nature and the war will be fought by fast moving mechanized forces at both sides.

Although the first part of this article accepts such a scenario, the second part examines the effects on a NATO defense in the increasingly urban and industrialized East/West border area.

The first Warsaw Pact troops to advance may be expected to be reconnaissance units. The Warsaw Pact reconnaissance array is designed to identify NATO movement and dispositions by ground observation units up to 100 kilometers forward of their main combat columns. Superimposed over this ground reconnaissance capability is air reconnaissance, both photographic and visual, and national technical means. This tactical intelligence potential updates the basic information gathered by the large number of agents said to be operating in West Germany. This presents a picture greatly different from the tank battalion columns headed by a reconnaissance screen portrayed in Colonel Tamminen's analysis.

Recently, it has been suggested by a British analyst that the Pact forces would be prepared to dispense with ground reconnaissance to achieve surprise. There is no evidence to support such an idea in the Soviet military press. The Pact's tactical concept depends on continuous updating of tactical intelligence to facilitate the rapid rate of advance which they hope will gain a quick victory. The question is, therefore, whether neutralizing enemy reconnaissance will significantly slow down the Pact's rate of advance.

Pact ground observation reconnaissance units are not unduly strong in armor. The vehicles used in divisional reconnaissance, the *PT-76* amphibious tank, the *BRDM* and motorcycle are vulnerable to machinegun, as well as anti-tank, fire. The long range reconnaissance units are either mounted in light trucks or more probably parachuted into position. A fast moving screen which is heavy in light anti-tank weapons should therefore be able to impose significant delay on the Pact ground reconnaissance force.

Colonel Tamminen envisions the use of heavy antitank means (tanks, *Sheridans*, *TOW* and armored helicopters) in the Covering Force Area (CFA). These weapons are, however, the basis for the mobile defense in the MBA. It would be unwise to count on a second employment for such assets after the CFA action. Should casualties not stop re-engagement, the difficulties of a break from contact will preclude early redeployment in the forward areas of the MBA.

It remains to find a force suitable for employment as a screen in the CFA, using weapons which will not be critically required to stop the enemy in the MBA. It is suggested that this be armored cavalry, heliborne infantry equipped with antitank guided missiles (ATGM), and attack helicopters, all supported by artillery. There may also be a role in this phase of operations for small parties of parachuted troops with ATGMs in critical areas. Long range antitank weapons are therefore in predominance.

It may be argued that such a screen would have little stopping power against the main body of the enemy advance, especially in a hostile air situation. The effect is however to make the Pact forces deploy tank and motorized rifle units to reinforce their lightly-armored reconnaissance force, and make Pact columns fight for tactical intelligence. This long range CFA engagement may allow time for NATO forces to establish a credible defense nearer the border.

It is now time to turn some attention to the MBA. No use is made, in Colonel Tamminen's analysis, of a major obstacle. This presumably is because in the flexible response

doctrine political considerations debar the initial defense being set behind a major river. However, a defensive position requires time to establish. Even when urban areas, forested regions, and minor obstacles give some cover, it will still require infantry "dug in," supported by tanks and artillery, to stop assaults in the areas of local superiority for which the Pact aims.

The new defensive concept foresees the planning, preparation and reconnaissance of positions at least three deep. This includes the digging of emplacements, coordination of fire support, and presumably the liaison required to cover both lateral and rear boundaries. Even though commanders at all levels may have an extremely good knowledge of their particular sector, the use of updated contingency plans, and unimpeded movement forward, the time to carry out such a degree of work may not be available. The use of Critical Path Analysis will show that, at company level the establishment of a single coordinated defense will require approximately 24 hours after arrival in the MBA. The physical state of the troops after 48-72 hours of continuous digging, clearing fields of fire, minelaying, and camouflaging three positions may be imagined.

The importance of relative strengths cannot therefore be avoided in this 'open country' side of the debate. The increasing conventional capacity of the Warsaw Pact has been aired sufficiently to make it unnecessary for further elaboration, but if a battlefield in a built-up or urban environment is examined, an even more interesting scenario emerges.

NATO Defense in Built-up Areas

The following remarks were made by Major General J. W. Stanier, MBE at the Royal United Services Institute for Defense Studies in a seminar in London on 26 March 1975:

"It is an easy misconception to think of the North German Plain as a vast billiard table of agricultural land, intersected here and there by great rivers and a certain amount of forest land. That was indeed how it looked at the end of the last war. Today, however, things are changing fast. There can be very few countries in the world where industry and housing is developing so quickly. The great cities of Hamburg, Hanover, Bremen, Braunschweig, Kassel, and Göttingen, to name but a few, are growing enormously all the time. It has been estimated that during the 1980s many of these great urbanizations are in fact going to link up with each other, giving the strategist a totally different problem to face, let alone the tactician."

The defense of such an area opens up whole new vistas to the military tactician in which there is at present little anticipatory thought. Though the North German Plain is not the particular concern of the U.S. Army, a similar urban development can be expected to occur to the South.

It may be argued that the Warsaw Pact would find operations in built-up areas as unattractive as does NATO. The value of the military occupation of a NATO city could, however, be an important political prize. The fact remains that considerable Soviet effort has been made to analyze the lessons of World War II and prepare the Soviet Ground Forces, at least theoretically, for operations in towns and cities. This contrasts with the NATO nations' extreme reluctance to plan, let alone train, for operations in developed urban confines. With the exception of Norway there appears

to be no *declared* intent to defend cities and towns at all. The topic appears to be politically and militarily unacceptable both to the public and to NATO tacticians.

No NATO army has recent combat experience in built-up areas as a full scale military operation. The British Army can claim the internal security operations in Northern Ireland and Aden as at least some preparation, but it should be noted that armored and artillery support has not been used in either case. The implications of this situation are significant. Should the Warsaw Pact be motivated sufficiently to risk nuclear conflict, can it be expected that the "gaps" in the NATO mobile defense, *formed by areas of urban and industrial development*, would be ignored?

Urban operations in which short weapon ranges, coordination difficulties, and radio communication degradation are common are almost the exact converse to the concept of mobile defense. A mobile defense in such conditions, while not impossible, is very difficult to achieve. It appears however, that little training is carried out by any of the major NATO armies to iron out the difficulties of urban operations except for small scale theoretical exercises.

Fighting in built-up areas not only requires new techniques to be mastered, it requires larger numbers of troops. If any military lesson is to be drawn from the British Army's operations in Belfast and Londonderry, it is that such affairs are manpower intensive. Combat in built-up areas therefore gives an added advantage to the Warsaw Pact's initial superiority in numbers.

A journal of this kind is not the place to air the question of NATO's political will to resist Warsaw Pact aggression. Colonel Tamminen's article on defensive concepts may be thought, however, to be only the opening gambit in a military tactician's solution of the problem. Within the political restraints given to NATO's military planners, we have to think through the subsequent moves after the initial deployment. Time is obviously going to be in short supply. There are gaps in our defenses in the urban areas, both of which factors are an advantage to a numerically stronger enemy. Above all, having delivered the "kick off" to our opponent, we must still be able to fight outnumbered and win. If the analogy to chess is acceptable, the interest lies not in the initial pawn's move, or in avoiding check, but forcing ones opponent into checkmate. We still have some way to go as far as the Warsaw Pact is concerned.



MAJ A. E. Hemesley was commissioned from Sandhurst into the Infantry in 1958 and served as a platoon and company commander in counter insurgency operations in Malaya, Aden and the Persian Gulf. He attended the British Staff College in 1969 and has been a staff officer in London and the Far East. After a tour as a mechanized company commander in Baor and duty in Northern Ireland, Major Hemesley is presently serving in the United States.

Friend or Foe?

by Robert K. Bauer

Blue One—This is Blue Two—Where are you?

This is Blue One. I'm parked alongside an old barn.

This is Blue Two. What do you see in your front?

This is Blue One. I see a tank in the edge of the woods.

This is Blue Two. Did you just shoot at that tank?

This is Blue One. Affirmative.

This is Blue Two. Did you hit that tank?

This is Blue One. Negative.

This is Blue Two. Are you going to shoot at that tank again?

This is Blue One. Affirmative. I've got one in the tube and loaded.

This is Blue Two. Don't do it! CEASE FIRE! That's me! That's me!



This gag about mistaken identification has been around for a long time. And, so has the problem of identifying armored vehicles as friend or foe.

Now something has been done about that problem.

Last year, the U.S. Army Training and Doctrine Command (TRADOC) convened a conference to coordinate the development and implementation of an Army-wide combat vehicle recognition training program. As a result of that conference and an on-going project then in existence, the U.S. Army Armor School has developed and pro-

duced three Training Extension Course (TEC) lessons on Armored Vehicle Recognition (AVR). These audio-visual lessons are now being issued to units equipped with Beseler Cue/See Training devices.

The three lessons, numbered 020-171-0201 through 020-171-0203, cover 17 armored vehicles of NATO and Warsaw Pact countries. The U.S. Army is represented by the M-60, M-60A1, M-60A2 and M-551. British tanks covered in the series are the Centurian and the Chieftain. The French vehicles represented are the AMX-30 and AMX-13. German

fighting vehicles include the Leopard and Jagdpanzer, and Soviet and Warsaw Pact equipment encompasses the T-62, T-55, T-34, T-10, PT-76, ASU-85, and ASU-57. (Note. Although the T-34 is no longer used in the Soviet Army, it is still used by some armies in other parts of the world.)

The first lesson of the series begins with a pretest to determine the soldier's ability to identify the vehicles covered in the lesson. If the student correctly identifies the 17 armored vehicle models, he is permitted to skip both the first and second lessons and proceed to lesson three where the vehi-

cles are presented in terrain settings.

Those students who do not identify all of the vehicles during the pretest for lesson one, begin the series by being shown the major parts of armored vehicles that can be used in identifying tanks and other armored equipment. Such things as the shapes of turrets, location of turrets, shapes of gun tubes and hulls, suspension systems, markings, and cupolas are presented visually and described simultaneously by a narrator. As an example, the following pictures and narrations are used to describe the turret's shape and location as an identifying feature.



American M-551—Notice the short gun tube and the lack of support rollers. The turret has an oval shape and there is a prominent cupola.



Chieftain—turret is centered on the hull and low...



AMX-13—turret is toward the rear of the hull and extends to the rear.

Similar sequences of visuals and narrations are used to familiarize the student with all significant identifying features of armored fighting vehicles and, once the identification indicators are covered, the lesson presents each of the 17 vehicles from different viewpoints—as in this series about the T-62.



From the front, the turret looks completely rounded.



The T-62 has a flat hull and an egg-shaped turret...



There is a long gun tube with a bore evacuator near the middle...

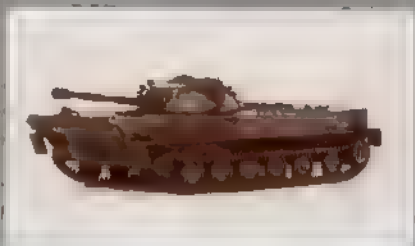


It may be seen with extra fuel drums in the rear...

When the soldier begins lesson two, he again takes a pretest. If he identifies all 17 vehicles correctly, he skips lesson two and continues with the third lesson. If not, he studies lesson two which reinforces lesson one by presenting significant identifying features by relating them to equipment of specific countries—for example, the narration for a series of visuals might sound like this:



If the gun tube is short, it is probably U.S....



If there are no support rollers, it is probably Soviet.

As with all three vehicle recognition lessons, lesson two contains many practice exercises in which the soldier is asked to identify a series of vehicles and is then given an answer and an explanation. For instance, these pictures would be shown in sequence at timed intervals, then reshowed with the narration that appears below each vehicle.



British Centurian—It has shrouds, a raised rear deck, a long gun tube with a bore evacuator near the middle.



Soviet ASU-57—A box on a suspension system and a gun that starts one-third of the way back. Also four road wheels and two support rollers.

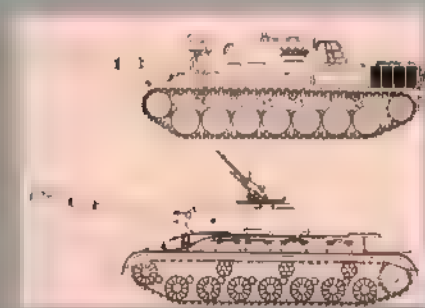


German Jagdpanzer—The gun tube seems to come directly out from the front of the vehicle. There is a bore evacuator and a muzzle brake.

The second lesson also compares vehicles. This is done by presenting visuals containing pictures of two vehicles while the narrator highlights distinguishing characteristics. Examples of these split visuals and accompanying narrative follow



From the side, the Leopard has prominent grills on its back deck and a larger turret than the Centurian. The Centurian also has shrouds covering its suspension.



The turret on the Leopard is centered, longer and larger compared to the T-10. The T-10 turret is well forward.

Since the armored vehicle crewman operating in a "real-world" environment will be viewing friendly and enemy vehicles from all angles and in a variety of settings, lesson three of the recognition series places scale models in positions on realistic miniature terrain. In this lesson the soldier is shown pictures of vehicles in hull down positions from several angles, tanks partially hidden in tree lines, assault guns approaching head-on, tanks entering wooded areas, tanks in the open against a background of matching color, and tanks in terrain settings that appear as they would at varying ranges. Some of the scenes at the beginning of the lesson are held on the screen for up to 10 seconds, while those near the end give the viewer a maximum of 5 seconds to make his decision to shoot or not to shoot. Typical scenes and accompanying narrations appear below.



French AMX-13—The AMX-13 has an unusual forwardward sloping turret with a long gun tube and a blast deflector. . .



Soviet ASU-85—Note the bore evacuator and blast deflector and searchlight over the gun tube. The gun tube starts about one-third back on the vehicle and there are no support rollers.



German Jagdpanzer—The gun tube comes directly out of the front of the vehicle. The sides slope out from the top. There is no turret.

As with the other recognition lessons, the soldier completes a self-evaluation test at the end of lesson three which requires him to identify all of the 17 vehicles when shown in a terrain setting. If he fails to do so, he may take any one or all three of the lessons over again as many times as he chooses until he is satisfied that he has mastered the subject.

Although these lessons do not cover all of the armored fighting vehicles that our soldiers may encounter on the battlefield, the lessons are a step toward better training in armored vehicle recognition and should help us avoid battles with our allies and ourselves.

For additional information about the TEC program see "Forging the Thunderbolt," page 7 and for other proposals for vehicle recognition training see "Professional Thoughts," page 43—ED.



ROBERT K. BAUER was commissioned in Armor from infantry OCS in 1970. He served in a variety of jobs within tank battalions at Ft Riley, KS, and Camp Casey, Korea, and also served on the staff and faculty of the U.S. Army Armor School. For the past 2½ years, Mr. Bauer has worked with the TEC program at Fort Knox, KY, and is the project officer for TEC lessons dealing with armored vehicle recognition



speed and that of the attack.¹⁸ In either case, the tanks become more vulnerable. Artillery can suppress antitank defenses, but this raises the possibility of a long, drawnout "slugging match" with lower rates of advance, greater ammunition expenditure, and higher logistics requirements. Even more critical, the vulnerability of one component of the Soviet combined-arms force places more strain on the other elements and greatly magnifies the problems of command and control in small units—a traditional Soviet weak point reflected in recent exercises.¹⁹

Ironically then, the recent Soviet concern over antitank weapons has actually raised rather than lowered the status of the tank. Practically all of the articles have emphasized the greater vulnerability of the BMP.²⁰ It is the BMP, not the tank, which is perceived as the weak link in the combined-arms chain.

Maintaining the Offensive

It is perhaps misleading to classify the recent Soviet writings as an antitank debate, for there is really no argument over whether antitank weapons are effective, and there is an apparently universal recognition that a tactical revolution is being brought about by the deployment of ATGM. Nor does there seem to be much disagreement between Soviet commentators over the implications—they generally agree that the ground force most threatened is the motorized infantry, which in turn, raises serious problems for the tempo and coordination of the offensive. What is being debated is how to overcome the challenge of antitank weapons and retain a high rate of advance against a strengthened NATO defensive capability.

While Soviet writers do not offer neat 'policy' packages, several patterns appear to be emerging. Reminiscent of the debates over the reduction of ground forces in the Khrushchev era, opinion groups seem to form around service branch rather than on the basis of personality cliques or modernist-traditionalist arguments. The various options can be grouped into three major categories:

The Nuclear Option.

For 30 years, the keystone of Soviet strategic and operational concepts for the employment of ground forces has been the "offensive." Starting with a massive bombardment of firepower, the ground forces would break through the prepared positions of the defender and massive tank armies would follow to engage the opponent's mobile reserves. At the end of World War II, the breakthrough phase was to be conducted by the massing of artillery fires. By the late 1950's the massive conventional artillery barrage had been replaced by multiple nuclear strikes; by the late 1960's the Soviet

doctrine again considered the possibility of a conventional breakthrough. Despite three decades of doctrinal and technical development, the armored forces were still thought to be the prime means of exploiting a breakthrough. But ATGM technologies threaten the Soviet Army with a tactical revolution and the potential abandonment of the armored offensive. There is, consequently, a strong incentive for the Soviet Union to return to her earlier dependence upon nuclear weapons as a means of overcoming antitank defenses.

Traditionally, the Soviet Union has not mirrored NATO's penchant for low-yield tactical nuclear weapons fired from self-propelled artillery, depending rather on higher-yield and less accurate rocket-delivered warheads. However, the last few years has seen a new interest in, and admiration for, self-propelled artillery in Soviet writings, with some linking of this with low-yield artillery-fired tactical nuclear weapons.²¹ In addition, several Soviet writers have argued recently that the problems which antitank weapons pose for the BMP do not apply in a nuclear environment. The first reason put forward is that in anticipation of nuclear fires, the defender will have to disperse his forces in case they fall victim to nuclear effects.²² Second, with the use of highly accurate nuclear fire against the defensive positions, the infantry does not have to dismount from the APCs and the attack can proceed at a high rate of advance.²³

Evidently, the Soviet Union only sees antitank weapons as a threat "when nuclear weapons are not used." Yet Soviet ground force commanders are clearly unwilling to discount the antitank problem by relying solely on nuclear weapons. For the present, the nuclear solution seems to have been ruled out by both political and operational considerations.

The Artillery Option.

In countering antitank weapons, particular importance is attached to the role played by the artillery. Many Soviet authors, particularly those from the artillery branch, argue that only massive suppressive fire from artillery "is capable of reliably destroying the enemy's antitank defense. During the conduct of combat operations not involving the use of weapons of mass destruction such a task rests almost entirely upon the artillery."²⁴ The artillery branch apparently relishes this new role for two main reasons: that within the Soviet Army, supervision of ATGM falls under the artillery branch; and that this is a major opportunity for artillery to regain its pre-Khrushchev influence and command over resources.

In the antitank debate, pro-armor writers insist that traditional indirect artillery fire is not sufficient to suppress antitank weapons.²⁵ The artillery advocates recognize this and repeatedly point out that artillery fire against antitank positions is much more effective when fired in a direct rather

¹⁸The problem is so severe that several Soviet writers have proposed forgetting the BMP and mounting the troops on the backs of tanks as in World War II. See Lt. Col. M. Tychko, "The Launching of Riflemen Mounted on Tanks," *Military Herald*, No. 1, January 1975.

¹⁹"... it would be an unforgivable mistake to keep silent about the lacks in combat training and specifically in field training... commanders and officers of staffs have still not learned to firmly control the actions of subordinates in battle, to maneuver with them, and did not always correctly use armored transporters and combat machines of the infantry (BMP) in breaking through a prepared defense, poorly organized cooperation of means of fire suppression, and did not take energetic measures to destroy ATGM and enemy antitank guns." General of the Army I. G. Pavlovsky, "The Field—The School of Combat Mastery," *Military Herald*, No. 1, January 1975.

²⁰Over half of the 50 articles covering the current antitank debate have focused on the BMP vulnerability exclusively. In fact when tanks are mentioned, it is usually in a favorable context—i.e. article within the last year was Col. N. Shaporalov "Teaching Crews to Combat Tanks, Self-propelled Artillery and ATGM," *Military Herald*, No. 6, June 1975.

²¹Col. P. Grigoryev, "Development of Cannon Artillery," *Soviet Military Review*, August 1971.

²²Col. V. Savkin, "Features of Modern Combat," *Military Herald*, No. 3, March 1974.

²³Pishakov and Kirpach, *op. cit.*

²⁴Col. A. Rodin "Struggle Between Artillery and Antitank Weapons," *Military Herald*, No. 5, May 1974.

²⁵"In actual combat, as soon as our artillery lifts its fire into the further reaches of the defense, the opponent could issue from cover, re-occupy his position, cut off the MR (motorized rifle) troops from the tanks by fire, and pin them (the former) to the ground. And this would lead to large unwarranted casualties in materiel and in personnel." Lt. General of Tank Troops A. Bondarenko, "On the Utility of BMP's in Battle," *Military Herald*, No. 10, October 1975.

than an indirect mode.²⁶ But to be truly effective in the direct fire mode, artillery will have to be decentralized in battery-sized units down to battalion level and "many direct fire weapons are needed to penetrate a defense."²⁷

To ensure that the artillery weapon has tactical mobility and to enable the crew to survive in close proximity to the tactical battle, the artillery must be armored and self-propelled. In fact, within the last year, the Soviet Union has deployed two new self-propelled, large-caliber artillery pieces with direct fire capability. This emphasis upon decentralization of direct fire self-propelled artillery demonstrates a major shift in traditional Soviet thought which hitherto emphasized massed indirect artillery barrages fired from towed equipment.²⁸

As the Soviet experts themselves are well aware, parceling out artillery in battery-sized units and attempting to coordinate the artillery with tanks and infantry is not without its potential disadvantages: even a small-unit tactical assault is rendered enormously complex. Battalion staffs—traditionally lean in personnel—will have to be expanded and even greater strain will be placed upon an already frugal logistic structure. The artillery itself becomes much more exposed and its decentralization becomes a major problem in coordinating massed fires.

The Maneuver Option.

As might be expected, officers of the tank troops strongly disagree with the artillery branch. Rather than slow the offensive down, they want to speed it up. Arguing against holding the armored forces back as the infantry launch a dismounted attack, General Bukharenko of the tank troops states: "It would seem that in modern fast moving combat, when each minute is precious, that this is not the best way to use such high speed military materiel."²⁹ Tank Troop General Skorodumov goes even further and attributes the vulnerability of Soviet APC to the slowness of attack.³⁰

These rejoinders by high-level tank officers raise some interesting points. First, they do not attempt to deny the effectiveness of antitank weapons. Second, where the tank advocates take exception to the artillery proponents is not in the use of fire suppression, but the restrictions such dependence places upon the speed of the attack. Third, while the BMP was originally perceived as a potential competitor to tanks (having many of the characteristics of a tank and closely associated with the meteoric rise of the rival motorized infantry branch), recently the tank branch has closed ranks with their armored brethren and become the most ardent defenders of the BMP. Basing their arguments on the BMP's superior speed and antitank armament, the tank commanders hold that not only should the infantry remain mounted, but that independent BMP units should be used in

daring surprise raids, deep in the enemy rear.³¹ But how can the vulnerability of BMP units to antitank weapons be reduced by placing greater emphasis upon them? The key to this question may lie in the Soviet interest in the growing "density" of antitank deployment. Soviet writers have long held that density—the ratio of force to space—is the key variable influencing rate of advance. The greater the quantity of force in a given area, the slower the movement, and conversely with a low force-to-space ratio the battlefield becomes granular rather than linear, fluid instead of static. Instead of nuclear weapons to disperse the defense, the armor advocates call for pre-emptive maneuver—attacking the defense before it can mobilize and deploy a dense antitank defense. Soviet writers note that surprise attacks with conventional weapons offer the same opportunities as nuclear strikes for low force densities: fluidity of maneuver, and a high initial rate of advance.

There are then several indications that in the event of conflict with NATO, the Red Army would prefer to launch a surprise attack without needing to rely upon massive mobilization of the rear echelon divisions in the Soviet Union or filling out under-strength forces of the Warsaw Pact. Such an attack, with in-place theater forces, might have a prospect of catching NATO before, or in the process of, mobilization, thus preventing the West from establishing a linear and dense forward-deployed antitank defense. This would permit the Soviet Union to concentrate her forces in the weakest zone of the defense and so maintain their potential for a rapid rate of advance. Soviet commentators often make the point that NATO ground forces, particularly the West German and American armies, are not geared to a prepared defense in depth, which would make the most favorable use of antitank weapons, but remain committed to the doctrine of a mobile defense based on brigade and division-level armored counterattacks. Thus, while the West still seems to believe that the tank is the best means of antitank defense, Soviet military writers are beginning to stress the offensive use of antitank weapons.

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³¹In order to employ effectively small units equipped with BMP, it is necessary to appreciate that such maneuverable small units, strengthened in firepower, are designated for daring raids into the depths of enemy defenses with the goal of circling around their strong points and exiting on the defender's flanks and rear. To this the special attention of the Minister of Defense and the CINC Ground Forces is directed." Bondarenko, *op. cit.*

²⁶Direct fire is over open sights, when the gunner can see the target; indirect fire is directed on to the target by an observer, displaced some distance from the guns.

²⁷Col. V. Selyavin, "Direct Fire," *Soviet Military Review*, November 1975. See also Col. V. Selyavin, "Artillery Breaches (antitank) Obstacles," *Soviet Military Review*, August 1975.

²⁸The original proponents of self-propelled artillery came from the tank branch, which argued that these weapons should fall under their jurisdiction, apparently they lost. For a detailed discussion see Marshal of Tank Troops Pavel A. Rotmistrov, *Time and the Tank* (Moscow, 1972), pp. 265-9.

²⁹Lt. General Bukharenko "On the Utility of the BMP in Battle," *Military Herald*, No. 11, November 1975.

³⁰Skorodumov, *op. cit.*



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THROUGH THE EYE OF THE HURRICANE!

by Lieutenant Colonel Andrew P. O'Meara, Jr.

Man changes and as he changes so also must the society change. Each day leaves its mark, yet man is so much a part of change that change often goes unnoticed. Man's growth, and the growth of his society, pass unnoticed in the heat and turmoil of life. One must step out of the mainstream of society and away from his fellow men to observe the movement, the flow of trends, and the marks of time. Even from afar, it is difficult to judge the society, for the flow of time continues to leave its marks, and who is to say that the changes man observes are actually changes in the society and not changes in the observer himself. The riddle has no answer, yet man is compelled to judge in order to define the meaning of his life, and future generations must make the final judgment of both man and his society.

Man goes off to war, and if he returns, he returns as another man, for time and the savage hurricane of war both leave their indelible marks. Yet the returning man can not perceive the gradual changes in himself. He can only perceive the vast change in the society he once knew, in the society that once knew him. The returning soldier stands upon a plateau divorced from his society and watches the movements of men and time of which he is no longer a part, and he is lost. He finds himself only by casting aside his perspective and drinking deeply in the thoughts and attitudes of today. By plunging headlong into the pursuits of contemporary society, he rejoins the mainstream, and gradually he begins to again mirror the society he once knew.

Half agnostic, half atheist, three-quarters skeptic, and five-eighths cynic, the soldier went to war. Conditioned by his materialistic and commercial society to be on guard, he moved with a calculated confidence and a long cultivated gait of self-assurance. And off he went to war. Entering the hurricane, he saw a new world of extremes and contrasts. The reds were redder. The hates were deeper. The noise was greater. The silence was crushing. The loneliness was intense. The love was most pure. The trust was more credible. And the waves of violence swept over him, and the winds of the hurricane lashed him, and he emerged in the eye of the hurricane.

The eye of the hurricane is a new world. The air is clean, the winds are gone. Silence has returned, yet our senses are keyed to each sight, sound, and smell. The muscles are taut and death is still near. It is a new world that is not relevant to the world the soldier left behind. The agnostic and the cynic come in contact with new realities, and the commercial values are shed unnoticed and are not missed. And slowly the winds of war begin to blow again, and the sky darkens and the waves of violence return.

War is not one hurricane that blows over in 24 hours. It is a long, endless storm that breaks again and again, leaving its victims in the eye of the hurricane time after time, with only the sure knowledge that violence shall return again. And man looks out into life through the eye of the hurricane, and the view is unique. Gone are the breakneck pace, the loud music, and the fads of a society in which death is invisible and a million miles away. In

the eye of the hurricane, death sits beside us. In time, death becomes an old friend, whom man no longer fears.

In the eye of the hurricane, life takes on a new perspective in which the color of a man's skin has no meaning, and commercialism is forgotten. It is in the eye of the hurricane that man makes peace with his God, and it is here that he discovers his soul. It is in the eye of the hurricane that the agnostic dies and the atheist fades away, and it is here that man may rediscover the wisdom embodied in 4,000 years of culture, that has been cast aside by the modern egocentric society in order to set free the prehistoric beast that resides within us.

When the final storm passes and the soldier returns from war, he is a different man, for when man makes peace with his God and prepares for death, his values change ever so slightly. And when man makes peace with his God on countless battlefields, he is altered forever. Death becomes a friend that sits beside him, not to haunt the living, but rather as a companion that allows man to accept in simple honesty both the brevity and the fragile nature of life. The agnostic is dead and the cynic is no more. The studied gait and empty gestures of the modern, urban man are an affectation of the past.

The final storm passes leaving in its wake the broken bodies of the dead, the spiritually broken souls of those incapable of withstanding the fury of the storm, and finally the spiritually reborn. And they each return, the dead in their caskets, the broken on crutches of drugs and therapy, and the spiritually reborn with new courage and shorn of the affectations and inhibitions of the past. They each return to a society that has also changed. For time and society have continued their reckless plunge into the future. Although many have returned, only the dead are home. Only the memories of the dead will not be shattered by the society that has no place for them.

The living are returned to a society that does not know them. Eyes meet without understanding, without comprehending. Time has moved on and all are changed. Those capable of standing outside the mainstream watch in disbelief and anguish, as the society they once knew dances by in its harsh sounds and garrish colors, as America makes love to itself, as man worships his nerve endings.

Where are you going, America? Where have you been? Do you recognize me? I am your son.

The dancers dance on, the music climbs, the colors weave and clash, and men smile and imitate empty sounds and hollow gestures. The stranger is unseen and unheard in the din and brilliance of the moment. The savage beast in man, masked in the costumes of the 20th Century, plunges on to fulfill and satisfy, to fight and climb, and to satisfy once more—the modern animal called man.



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At approximately 0400 hours, 25 June 1950, the People's Army of North Korea launched a full-scale attack across the 38th parallel into The Republic of South Korea. This attack began a series of events which would lead to America's first involvement in a "limited" war and the first near defeat of the American Army since the Revolution. But, three months after the North Korean invasion, a brilliantly conceived and executed amphibious landing at the port city of Inchon by American and South Korean troops brought the momentum of the North Korean advance to an abrupt halt and led to the rout and near annihilation of the entire North Korean Army.

That amphibious assault, code named *Operation*

navy. In the South, U.S. aid had constituted a lightly armed constabulary, hopefully capable of protecting its borders and maintaining order, but not strong enough to withstand an invasion by the People's Army of North Korea.

The American forces in the Far East were similarly ill equipped to face the North Korean onslaught. The majority of U.S. ground troops in the Far East were carrying out occupation duties with the Eighth Army in Japan, a subordinate unit of the American Far East Command (FEC), and under the overall control of General Douglas MacArthur. The four infantry divisions of the Eighth Army: the 1st Cavalry Division, and 7th, 24th, and 25th Infantry Divisions, were vastly understaffed. Each division was short of its war

A Study of Generalship

OPERATION CHROMITE



by Captain James P. Totten

Chromite, was conceived and executed in 90 days by General Douglas MacArthur in the face of extreme enemy pressure, against the advice of his own personal staff, and the opposition of his superiors. "Operation Chromite" was an extremely dangerous plan executed without regard to tactical doctrine in order to gain surprise and to achieve unprecedented success.

In order to fully understand the magnitude and audacity of *Chromite*, it is necessary to examine the situation that existed in Korea in 1950. After the Japanese surrender in 1945, Korea was divided along the 38th parallel into North and South Korea. North Korea was occupied by Russian military forces, and South Korea by U.S. military forces. When the occupying forces withdrew in 1949, they each left behind a Korean army, armed and trained by its respective occupier and each with a vastly different capability. In North Korea, the Russians had built an offensive-type force equipped with armor, heavy artillery, and even a small tactical air force and

strength by nearly 7,000 men, 1,500 rifles, and 100 90-mm antitank guns, 3 rifle battalions, 6 heavy tank companies, 3 105-mm artillery batteries, and 3 antiaircraft artillery batteries. These units were further hampered by a lack of maneuver space for training in the densely populated Japanese Islands.

The primary reason for the FEC's poor stature was that United States foreign policy had ignored the possibility of Communist expansion in Asia and was oriented to containing the Communist threat in Western Europe. There were no plans facing the possible North Korean aggression because South Korea was not considered to be strategically important to the defense of United States possessions in the Pacific or to the United States itself. MacArthur's only guidance in the event of war was to evacuate American nationals in South Korea and to give South Korea any available military aid. Ironically, only 6 days before the invasion, John Foster Dulles, travelling as a representative of the President

addressed the National Assembly of the Republic of South Korea, and told them that they could be assured of United States support . . . "consistent with your own self respect and primary dependence on your own efforts."

Little guidance was given concerning the defense of South Korea. The FEC and the Joint Chiefs of Staff (JCS) paid little attention to intelligence reports of Communist troop movements north of the 38th parallel. Despite a series of border raids in 1948 and 1949 by the North Koreans, as well as a Communist inspired insurgency in South Korea, little thought was given to the possibility of a major confrontation. As a result, the North Korean attack came as a complete surprise. As was too often the case, news of the invasion reached Washington via the wire services before any notification was received by the Pentagon through military channels.

"The North Korean invasion was a blatant Communist challenge to American promises to her allies."

President Truman's immediate response to the situation in Korea was to authorize military aid to the South Korean (ROK) Army and to give MacArthur operational control of the U.S. Seventh Fleet to cover the evacuation of Americans. These immediate measures were not enough, for by 27 June, the fall of South Korea's capitol, Seoul, was inevitable; the South Koreans could not even slow the enemy advance. President Truman, supported by a United Nations proclamation calling for all member nations to come to the aid of South Korea, authorized MacArthur to use U.S. aircraft to bomb enemy targets south of the 38th parallel. However, by 29 June, the fall of the entire country of South Korea appeared to be unavoidable without even more American aid, and MacArthur decided to travel to South Korea to make a personal estimate.

MacArthur's mental turmoil prior to his arrival in Korea is best expressed in his own words, "My immediate problems were pressing ones. Would U.S. air and naval forces be enough? Could the South Korean defenders, supported by these forces and supplied with armor, make a successful stand against the powerful war machine that was rolling down upon them from the north? Or would U.S. ground troops have to be thrown into the battle after all South Korea was lost?" Upon landing in Korea and observing the deteriorating South Korean defensive line along the Han River, south of Seoul, the answers to his questions became obvious. There would be no deliverance for South Korea unless American ground troops were immediately committed to stop the North Korean advance and secure a foothold in South Korea. MacArthur cabled his observations to the President and the JCS.

On 30 June 1950, President Truman authorized the deployment of U.S. troops to South Korea.

This rapid reversal of American policy in Korea is some-

what bewildering, but it was based primarily on one consideration. The North Korean invasion was a blatant Communist challenge to American promises to her allies. A failure by the United States to honor her commitments would be damaging to American prestige, not only in Asia, but throughout the entire world. The American decision to fight in Korea, based on the intangible element of prestige, was to have a far reaching effect throughout the Korean war. However, its most immediate effect would be on MacArthur's planning, for MacArthur understood completely the value of the oriental concept of "face" and realized that he had no time to lose if he were to recoup American prestige.

The decision to commit U.S. troops posed several problems for MacArthur: he would first have to stop the enemy and regain the initiative, and the only troops readily available were those of the understrength and poorly trained Eighth Army. His problems were compounded by the fact that any decisive counteroffensive would have to be initiated before the cruel Korean winter set in, and American troops would have to fight the weather as well as the enemy. MacArthur also realized that every day he delayed gave his enemies more time to consolidate their gains.

MacArthur rapidly conceived a plan for a counteroffensive. He decided to first deploy what troops were available to him to Korea, relying on strategic maneuver and the North Korean Commander's fear of the American Army to cause the enemy to deploy and slow their advance. He would use the time gained by the enemy deployment to funnel men and equipment into South Korea through Pusan, the only large port in South Korea unoccupied by the enemy. He would then stop and hold the bulk of the enemy army with a defensive perimeter around Pusan, while simultaneously cutting the enemy supply lines with an amphibious attack to their north. With a force on either side of the North Korean Army, he would catch the enemy in a vise and destroy them.

MacArthur himself states that he first envisioned his strategy, and picked Inchon as the best landing site for his purposes while he looked across the Han River on his visit to Korea on 29 June. At the time, he did not realize the powerful opposition that his plan would create. MacArthur's decision to use a landing to isolate the North Korean Army was not particularly innovative; it was a modern adaptation of Napoleonic strategy by which the enemy is defeated with a simple turning movement which exposes his flank or rear, and forces him to fight in two directions. The Navy and Marine Corps had many well trained and experienced men with which to execute an amphibious landing, and MacArthur had perfected the tactic of strategic envelopment using similar landings against the Japanese in World War II. Nor was the choice of Inchon as an invasion site unprecedented—the city had been used as an invasion site by the Japanese on two previous occasions: once in 1894 against the Chinese, and once in 1904 against the Russians.

The location of Inchon was perfect for MacArthur's purposes. Inchon is the largest port in South Korea and is only 20 miles from Seoul. The geography of South Korea and its lack of a good road network from north to south forced the North Koreans to transport the bulk of their supplies through Seoul. Thus, an amphibious landing at Inchon would allow the invading force to advance rapidly to the capitol, placing a large force behind the enemy while



Although the tide could go as high as 30 feet, at low tide, the Inchon Harbor was up to 2 miles of impassable mud flats.

simultaneously cutting the flow of supplies to his army. Additionally, an amphibious attack at Inchon, if successful, would capture Seoul, the political and psychological capitol of Korea, and would reap a harvest of prestige. This element of prestige was to become Inchon's most valuable asset.

Unfortunately for the Navy and Marine Corps planners of the operation, Inchon incorporates almost every tactical and logistical problem that can be conceived of for an amphibious landing. Inchon can only be approached by a narrow, winding channel, aptly named *Flying Fish Channel*, for "a fish had to fly to beat the current." The channel and the harbor are dominated by Wolmido Island which rises 350 feet above the water and was reported to be heavily fortified. The tides in the harbor had an average rise and fall of 20.7 feet and could go as high as 30 feet. At low tide, the land is separated from the water by up to 2 miles of impassable mud flats. In addition, Navy planners calculated that the only tide sufficient to float a landing party over the mud flats would occur in September, barely 90 days away, the bare minimum of time required for the detailed planning of even the simplest amphibious operation. One Navy planner commented, "We drew up a list of every conceivable natural and geographical handicap and Inchon had 'em all."

The Marine Corps had similar objections to Inchon as a landing site. The large rise and fall of the tides would force the landing to take place in two phases: one on the morning tide and one on the evening tide. The first wave would be out of physical contact with reinforcements during the intervening low tide. The success of the entire landing would depend on the ability of naval gunfire and bombing to neutralize Wolmido, and the Marines' ability to assault across a 12-foot sea wall directly into a fortified city. Even if the Marines were successful in getting ashore by securing Wolmido with the first wave and sending the second wave into the city, the second wave would have only a few hours of daylight to consolidate their gains before nightfall.

The planning problems posed by Inchon were minor compared to the immediate difficulties MacArthur faced in

Japan and Korea. MacArthur's most pressing difficulty throughout the operation was to be a shortage of manpower. He successfully deployed three of his four divisions to Korea, leaving the 7th Infantry Division in Japan as a replacement pool and to protect the islands. However, in MacArthur's eyes, the Communist invasion of South Korea only served to prove that Japan, too, might be invaded, and the 7th Infantry Division was too weak to be any deterrent. Also, the units in Korea were suffering casualties faster than replacements could arrive from the United States. If some drastic measures were not taken, the Eighth Army would be defeated by attrition alone. On 8 July, MacArthur authorized two unprecedented steps: he directed the Japanese to increase their national defense force to 100,000 men and directed the Eighth Army in Korea to integrate South Koreans into American units on a "buddy plan" to bring the divisions up to full strength.

The decision to incorporate untrained, foreign nationals into the U.S. Army and to allow a former enemy, Japan, to increase its military forces beyond those of the U.S. were economy of force measures prompted by the reluctance of the JCS to commit more troops to Korea. According to a JCS spokesman, the unwillingness of the JCS was due to two basic considerations, "First of all, we did not have the wherewithall in the form of trained reserves of units or replacements, and second, we had to consider not the immediate danger in Korea, but also the much greater potential threat of a Communist attack against Western Europe."

By early August, enough replacements had arrived in Korea to enable General Walker, the Eighth Army Commander, to hold a line known as the Pusan Perimeter along the Nakdong River around Pusan. However, the Eighth Army was still trapped inside the perimeter, and MacArthur had not received any forces he could use in his landings to break the deadlock.

MacArthur had started demanding more troops for Korea in early July with a requisition for a four-division field army, including an airborne regimental combat team. Each suc-

ceeding request became smaller as it became apparent that the JCS could not readily release any troops. Finally, in August, the decision was made that the invasion force would consist of two divisions, one of which would be the 7th Division, already in Japan. The second division would be the 1st Marine Division, which the Navy had promised would be ready for deployment to Korea by September. However, to fill the ranks of the 1st Division, the Marine Corps was forced to recall all of its commissioned and enlisted reserves to active duty, and to transfer units from as far away as the Mediterranean Sixth U.S. Fleet. Even then, the entire division would not be available for the landings in September; the third and last regiment would not arrive in Korea until 17 September, two days after the landings.

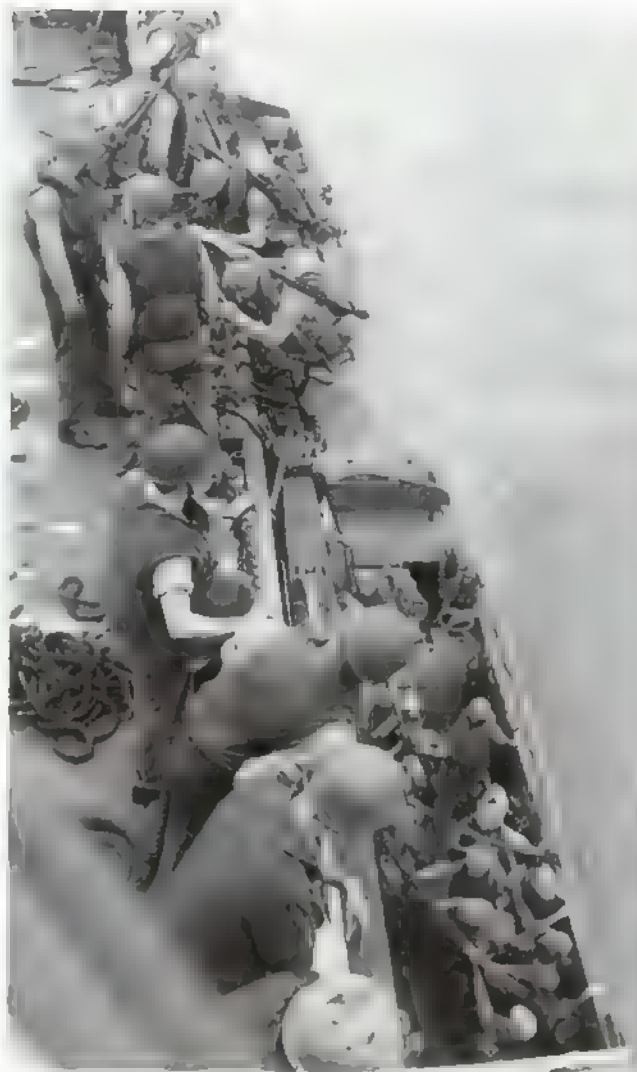
The 7th Division was drastically understrength. To bring it to even approximate war strength for the landings, MacArthur was forced to divert men bound for the Eighth Army in Korea. His efforts to build and train the 7th Division into an effective unit were assisted by the arrival of a group of instructors from the Infantry and Artillery Schools in the United States. However, he was still forced to bring several thousand South Korean soldiers to Japan to integrate under the "buddy plan."

The only portion of the operation which did not appear to be having difficulty was the selection of a staff for its execution. MacArthur had directed his Operations Officer, General Wright, to have the FEC's Joint Strategic Plans and Operations Group (JSPOG) draw up plans for a landing at Inchon in July. This landing, codenamed *Operation Bluehearts*, would use the 7th Division and the 1st Cavalry Division. However, the situation in Korea necessitated the deployment of the 1st Cavalry to the Eighth Army before *Bluehearts* could be executed, and the operation had to be abandoned. When *Bluehearts* was scrapped for lack of manpower, plans for a landing at Inchon continued.

Despite many disadvantages of the site and the disagreement of the Navy and Marine Corps planners, the plans for *Chromite* began to emerge. As *Chromite* took shape, it was obvious that the Eighth Army, already hard pressed in Korea, would not have the assets within its own staff to execute the operation. Therefore, it became necessary to activate a new Corps level headquarters to coordinate the activities of the two-division invasion force at Inchon.

The activation of a Corps level staff is an immense undertaking, and the effectiveness of the staff lies entirely in the members' ability to establish operating procedures where responsibilities are clearly defined. Generally, these procedures evolve within the staff and are modified by the ability of the members to work together and their collective experience. General Shepherd, the Commander of the Fleet Marine Force in Hawaii, had offered members of his own staff to form the new headquarters, but MacArthur decided to use the members of the JSPOG.

General Almond, MacArthur's Chief of Staff for the FEC, was chosen to be the new Corps Commander, and he immediately began to build a working relationship within his new Corps Headquarters. Almond secretly assembled his staff in an abandoned airplane hangar in Tokyo and began training operations. By working all night, 7 days a week, and using a series of command post exercises and simulated battles, Almond was ready for the official activation by General MacArthur of the X Corps on 26 August.



Marines of the 1st Marine Division descend cargo nets into waiting landing craft in preparation for the Inchon landings.

MacArthur had several reasons for forming the new staff from members of JSPOG. Primarily, he wanted to use men who were intimately familiar with the plans for *Chromite*. However, he also sought to minimize opposition to *Chromite* by using men who were already habitually loyal to him as their commander. Although the Navy and Marine Corps members of the JSPOG were by no means quiet in their opposition to *Chromite* and enthusiastically supported alternative landing sites to Inchon, there was a certain dedication to MacArthur which carried the plan through to completion. One staff member said, "It would have made no difference whether I 'believed' in Inchon or not. The decision was General MacArthur's and I would have executed it successfully if it was humanly possible to do so."

MacArthur was wise to chose the X Corps staff in the manner in which he did, for he would receive more than enough opposition to *Chromite* from his superiors on the JCS. Throughout the planning phase of *Chromite*, MacArthur was extremely uncommunicative in relaying his plans for future operations to the JCS. With the exception of messages to Washington asking for more troops, he had very little dialogue with his superiors. On 13 July, General Col-

lins, the Chief of Staff of the Army, and General Vandenburg, the Chief of Staff of the Air Force, travelled to Japan to gather information for the President. MacArthur and his staff briefed them on his plans, including the plans for Inchon, and gave them an escort for a tour of the Eighth Army in the Pusan Perimeter.

Collins relates that he experienced some misgivings when he heard MacArthur's plans for an Inchon landing, but since he had no authority to approve or disapprove the plan, he simply passed it on to the JCS when he returned to Washington. On 23 July, MacArthur cabled the JCS that he intended to carry out his plan as it had been outlined to Collins and Vandenburg, and the JCS began to have grave misgivings. Since no further information was forthcoming from MacArthur, two more representatives were dispatched to Japan, General Ridgeway for the JCS, and Mr. Averell Harriman for the President. Evidently, MacArthur used more effort to convince this second group of emissaries, because when they returned to the United States on 8 August, they were prepared to defend the operation. Mr. Harriman even praised MacArthur for his genius and called him a "great national asset." After the return of Ridgeway and Harriman, the limited flow of information on which to base their own plans continued to plague the JCS, and in late August, Collins returned to Japan, this time accompanied by Admiral Sherman, Chief of Naval Operations.

The JCS, as a group, was dubious about the success of *Chromite* for several reasons. The opinion of their chairman, General Omar Bradley, that amphibious landings were obsolete in modern warfare, may have had some influence on their collective reasoning, but their objections were not tied to this. First of all, the Eighth Army was under extremely heavy pressure along the Pusan Perimeter, and if the Eighth Army broke, *Chromite* would not succeed. Secondly, almost every available man had been stripped from U.S. defenses elsewhere in the world, and the JCS was reluctant to chance a large operation at a location as questionable as Inchon, with the only real combat power remaining in the armed forces. The last major objection to a landing at Inchon, and perhaps the most difficult one for MacArthur to overcome,

was the fact that there were two much better landing sites available that would require much less risk: Posung-Myon and Kunsan.

MacArthur presented General Collins and Admiral Sher-

"If MacArthur had gone on stage, you never would have heard of John Barrymore."

man with a detailed briefing on 23 August, which was designed to allay their fears and gain their support. During the briefing, MacArthur's Navy planners openly demonstrated that they were pessimistic about the chances of *Chromite's* success; they were more concerned with Inchon's physical limitations as a landing site, than with the propaganda that a successful landing at Inchon and a rapid capture of Seoul would afford. As the briefing ended, it was apparent to MacArthur that Collins and Sherman, as well as members of his own staff, remained unconvinced that the advantages of Inchon outweighed the disadvantages. MacArthur took the floor and presented an impassioned and eloquent dissertation on the value of the Inchon landing. He was so successful in swaying his audience, that when he finished, there was hardly a man present who was not willing to carry the operation to completion on faith, if nothing else. Admiral Doyle, the chief Navy planner, later remarked "If MacArthur had gone on stage, you never would have heard of John Barrymore." Even one of the Naval officers present remarked that "Inchon was not impossible."

The following day Collins and Sherman spent several hours with MacArthur and his staff obtaining answers to specific questions. Collins did query MacArthur on the feasibility of landing at Kunsan rather than Inchon, but MacArthur brushed this aside with the reply that Kunsan would not allow a deep enough penetration to envelope the bulk of the North Korean Army, while Inchon would. Apparently Collins and Sherman were persuaded, for on their return to Washington, the JCS re-examined the plan and sent MacArthur their approval on 28 August, with only a suggestion that alternative plans for a landing at Kunsan be prepared.

While MacArthur had used persuasion in dealing with his superiors, he used quite a different method in answering the doubts of his subordinates. Major General O.P. Smith, Commander of the 1st Marine Division, had arrived in Japan ahead of his division and had noted with dismay the plans for the landing at Inchon. Smith arranged an appointment with Almond and MacArthur just prior to the briefing for Collins and Sherman. During this meeting, Smith acted as the spokesman for the Navy and Marine Corps and outlined all the objections to Inchon as a landing site; he also presented Posung-Myon as a more desirable alternative. Almond stated that the decision to land at Inchon was final; that only by its seizure could the capture of Seoul at an early date be certain—for the first time the Marine and Navy commanders became aware of Seoul as a political objective.



Landing craft, equipped with scaling ladders, carry Marines shoreward for their assault across the seawall at Inchon.

MacArthur dismissed Smith's arguments against Inchon and stated that Posung-Myon did not have a sufficient road network to support a breakout from the beachhead after the landing and was not close enough to Seoul to ensure a rapid

"The enemy commander will reason that no one would be so brash as to make such an attempt."

capture of the city. "It soon became obvious that considerable propaganda value was being attached to the recapture of Seoul by the 26th of September—90 days after its loss to the enemy."

The only question that had not been asked during any of the briefings concerned the number and type of North Korean forces defending the city. Collins and Sherman had done an excellent job of gathering all the other information concerning Inchon to present to the JCS on their return. However, Collins and Sherman had failed to examine the possibility of a strong garrison in the city. MacArthur had considered this point, but had intuitively dismissed it; he said "The enemy commander will reason that no one would be so brash as to make such an attempt." Actually, there had been no opportunity for MacArthur's intelligence staff to evaluate the enemy's defensive tactics, for all the accumulated intelligence on the North Korean Army dealt with their offensive tactics, having been gathered during the enemy advance through South Korea. Fortunately for the forces that landed at Inchon, the enemy commander shared MacArthur's views, for the garrison at Inchon consisted of only "two battalions of raw conscripts, and eight 76-mm guns manned by 200 gunners."

By the beginning of September, MacArthur had successfully overcome the arguments of his opponents by either persuasion or tactful coercion. However, he had to face one remaining crisis in early September. Heavy enemy pressure on the Pusan Perimeter had caused the JCS to have doubts that the perimeter could hold or that Seoul could be taken, and on 7 September, MacArthur received a message urging him to abandon his Inchon plan and to reconsider landing at Kunsan. To MacArthur, these "eleventh hour" doubts were heresy, and he replied by telegram, in very strong language, that the perimeter would hold and that the landing would succeed. His message either reassured the JCS or demonstrated the futility of trying to change his mind, for on 8 September, they reappraised his plan, this time with the President's endorsement.

MacArthur did not require an approval of *Chromite* from the JCS to execute the operation. *Chromite* was technically a tactical operation and MacArthur had the authority, as the theater commander, to carry it out on his own volition. However, the JCS did have the power to disapprove the operation if they desired. It has been said that the first approval of *Chromite*, on 28 August, was an attempt by the JCS to retain the option of disapproving the operation at a later date should it prove to be too hazardous. The second approval, on 8 September, with the additional, unnecessary

Presidential endorsement, was simply the JCS's manner of ridding themselves of responsibility should the operation fail. One historian has made the observation that, "Whatever risks might be taken in the field, the experienced commanders in Washington were guarding against all eventualities."

The actual execution of *Chromite* was also anticlimactic. The first assault elements of Marines reached Wolmido Island and landed unopposed at 0633 hours, 15 September. By 0800, the Marines had secured the island after suffering only 17 casualties and killing or capturing over 200 North Koreans. The second assault followed on the afternoon tide at 1645 hours and by 0200 hours 16 September, the objectives within the city had been captured. Total casualties for the entire landing force on D-day were 20 men killed, one missing in action, and 174 wounded.

Even the Navy had little cause for complaint. With the exception of a mine encountered by the lead ships of the gunfire flotilla, the *Flying Fish Channel* was unmined. Sporadic fire from the North Korean shore batteries failed to seriously damage any ships before the Navy could silence the enemy guns. Furthermore, the convoy of troopships entering the harbor in the predawn darkness was able to navigate with the aid of one of the harbor lights which had been turned on by a Navy Lieutenant put ashore for that purpose.

The landing was a complete success, and the credit went almost solely to General MacArthur. *Chromite* remains today as an example of an incredible gamble taken by a courageous commander to achieve unequalled success. It was a success that has been described thusly by author David Rees in his book *Korea: The Limited War*. "Inchon could not have happened under any other commander but MacArthur. It sprang from his overpowering personality and his self-confidence, and his plan was supported by no one else, for it looked back to an age of warfare unencumbered by specialist objections and peripatetic Joint Chiefs. It remains an astonishing achievement precisely because it was a triumph not of military logic and science, but of imagination and intuition. It was justified on no other grounds, but the most overwhelming, most simple; it succeeded and remains a Twentieth Century Cannae ever to be studied."

All photos are courtesy of U.S. Marine Corps.



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Recognition Quiz

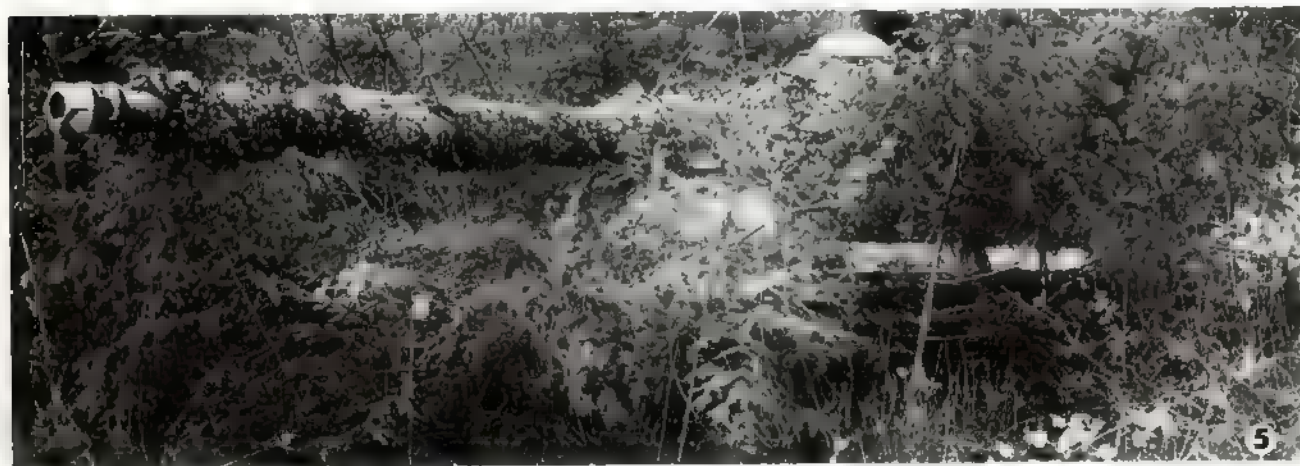
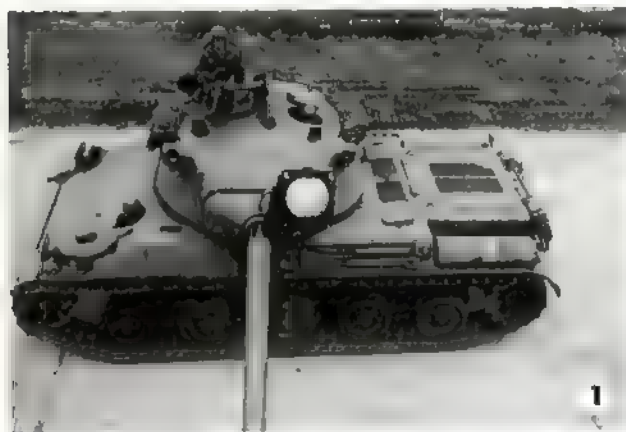
Friend or Foe?

Beginning with this issue, *ARMOR* will feature an Armored Vehicle Recognition Quiz that will enable the reader to test his ability to identify the armored vehicles of armored forces throughout the world. *ARMOR* will be able to sustain the feature for several issues, but, since our photo files are limited, we must solicit the help of readers who can provide

us with good photographs of armored fighting vehicles. Pictures furnished by our readers will be returned and appropriate credit lines will be used to identify the source of pictures used. Descriptive data concerning the vehicle appearing in the picture should also be provided. Suggestions for improving or expanding this feature are welcome.

—ED.

(Answers on page 61)



A Critical Look



The following critique of the General Accounting Office's report on the XM-1 procurement program was prepared by Senator Robert Taft, Jr. (R-Ohio) in collaboration with Mr. William S. Lind, legislative aid to the senator. The critique was introduced into the Congressional Record by Senator Taft on 10 August 1976. ED.

The report of the General Accounting Office (GAO) "Critical Considerations in the Acquisition of a New Main Battle Tank" is an important contribution to the current debate surrounding the XM-1 tank. It addresses a number of issues which are central to this debate, but the most important question it discusses is also the most basic: *Do we, in fact, need a new main battle tank?*

In its concluding recommendations, the GAO report states that:

"We therefore recommend that the Secretary of Defense accelerate ongoing studies which would consider the cost-effectiveness of an alternate armored force not wholly dependent on the use of costly heavy tanks and . . . (the Congress should consider) whether the Department of Defense should be encouraged to develop cheaper tanks which, fielded in greater numbers, might better offset the Warsaw Pact's numerical tank advantage than large numbers of heavy tanks."¹

In the same report, the GAO suggests two possible alternatives to a new main battle tank: "to field more low-cost tanks and more antitank weapons," and "to insure that 'obsolescent' tanks . . . are not disposed of but rather converted to diesel engines, given increased horsepower, and perhaps given improved fire control. The current price of the M-60A1 is approximately \$380,000, so the money spent on an XM-1 would buy two M-60."²

The GAO in effect presents three basic alternatives to the acquisition of a new main battle tank.

- More antitank weapons;
- A low-cost tank (light tank), to be procured in comparatively large numbers; and
- Continued use of existing tanks or tank designs (M-60, M-48).

The GAO considers these alternatives in combination, including in combination with smaller-than-planned numbers of new main battle tanks.

Unfortunately, there are serious flaws in the GAO's study of these alternatives, which become apparent as we examine more closely each of the GAO proposals.

Alternative No. 1—More Reliance on Antitank Weapons

The last 10 years have seen the development and world-

wide deployment of light antitank weapons. While differing in certain respects, all such weapons have two characteristics in common: They are rocket-propelled, hence lower velocity than cannon projectiles; and they rely on a shaped-charge warhead to penetrate armor. The U.S. *LAW*, *TOW*, and *Dragon*; the Soviet *Snapper*, *Swatter*, and *Sagger*; and the European *HOT* and *Milan* are examples of weapons of this type.

The light antitank weapons used by the Egyptians in the last Mideast war did prove effective against Israeli tanks, although how much they altered the preexisting tank and antitank balance is difficult to determine. Tanks have always suffered heavily when used frontally, without adequate artillery support, against prepared antitank positions. Even so, the vast majority of tank kills in that war were by other tanks, not by antitank weapons, and the decisive action on the Sinai front, the Israeli encirclement of the Egyptian Third Army, was an armored thrust on the classic blitzkrieg model.

Nevertheless, these considerations have not served to lessen worldwide interest in light antitank weapons. Many countries now produce such weapons, and almost every army in the world has acquired them.

Ironically, it is precisely this fact which lends urgency to the deployment by the United States of a new main battle tank. The development of a new type of armor, generally referred to as *Chobham* armor, gives the proposed main battle tank an ability present tanks lack. The new armor, unlike the armor on the M-60, can defeat the light antitank weapon. The details of the composition of Chobham armor are classified. However, it is known to be effective against all types of shaped-charge antitank weapons and projectiles. Since all of the new antitank weapons depend on a shaped-charge warhead, Chobham armor represents a major breakthrough in tank design. Tanks protected with Chobham armor are largely invulnerable to infantry and other light antitank weapons.³ In addition, many older tanks, armed with smaller caliber guns, depend on shaped-charge (*HEAT*) ammunition; a tank with Chobham armor would have similar invulnerability against their main guns.

Technological developments do not appear likely to reverse this situation. Light antitank weapons cannot utilize kinetic energy, the main alternative to a shaped-charge warhead, because rocket-propelled projectiles simply cannot

¹GAO report "Critical Considerations in the Acquisition of a New Main Tank, (unclassified version) 22 July 1976, p. 52.

²Ibid., p. 25.

³A data analysis of over 500 tanks sustaining hits in the Mideast war indicates that a high percentage of those hits were in the frontal arc of the vehicle, where Chobham armor is extensively incorporated in the new main battle tank designs.

produce sufficient velocity. On the other hand, a shaped-charge warhead of sufficient diameter to penetrate a normal thickness of Chobham armor would be too large for control of its burning characteristics.

The development of Chobham armor has two implications for the development by the United States of a new main battle tank. It reinforces the need for a new tank, in that all of the new tank contenders (both the *XM-1* designs and the *Leopard*) incorporate Chobham armor, while the *M-60* does not. A U.S. main battle tank which is largely invulnerable to every active antitank system except a major caliber gun has obvious advantages.⁴

At the same time, the development of Chobham armor raises serious doubt about the wisdom of suggesting that the United States increase its reliance on shaped-charge antitank weapons. Chobham armor is not an American secret. It was developed by the British and is now being incorporated in tanks built for Iran in Britain. The German *Leopard 2*, as well as the U.S. *XM-1* contenders, also incorporate this armor. Given the general superiority of the Soviet Union over the West in basic metallurgy, there is little doubt that Soviet main battle tanks will soon incorporate advanced armor with capabilities similar to Chobham armor. Indeed, the newest Soviet tank, the *T-72*, may have advanced armor of some type.

Clearly it would be unwise for the United States to rely more heavily on shaped-charge antitank weapons just as the future effectiveness of such weapons has been greatly reduced by new armor developments. Antitank weapons are becoming even less capable than previously of substituting for the large-caliber, high-velocity gun on the main battle tank. The GAO has failed to take this fact into account in their recommendation of more antitank weapons as an alternative, or even a partial alternative, to a new main battle tank. Similarly, the GAO report failed to give adequate weight to the advantages that would accrue to the United States from possessing a main battle tank which would, through the incorporation of Chobham armor, have an almost complete ability to defeat the opponent's antitank weapons.

Alternative No. 2—The Light Tank

The GAO report frequently suggests a new design of light, "more agile" tanks as an alternative to at least part of the planned new main battle tank force. The GAO argument for light tanks ignores the fact that both *XM-1* contenders and the *Leopard 2* are among the most agile armored vehicles of any type or weight in the world, thanks to their high horsepower-to-weight ratios and advanced suspension systems.

A new light tank would be critically deficient in two respects concerning the relationship between Chobham armor and antitank weapons. In the first place, Chobham armor is not light. A tank that incorporates a sufficient thickness of it in critical areas must be a heavy tank. Thus, a new light tank could not possibly incorporate Chobham armor and would be highly vulnerable to all of the many antitank weapons which utilize a shaped-charge warhead. This consideration alone appears to deny the cost effectiveness of investing in a new light tank.

This deficiency of the light tank concept is reinforced by

⁴Guns of 105 caliber and higher can use kinetic energy rounds effectively against normal thicknesses of Chobham armor.

the fact that the light tank itself would probably be compelled to have as its main armament a system dependent on a shaped-charge warhead. The size, weight, and recoil of a high-velocity gun of caliber 105 or larger would make it difficult to incorporate effectively such a gun in a light tank. Attempts to construct light tanks with heavy armament, such as the *M-551 Sheridan* or the French *AMX-13*, have not been satisfactory. Yet only a high-velocity, large-caliber gun can use a kinetic energy round with sufficient impact to be effective against even existing, much less future, Soviet tanks. If the light tank could not carry a high-velocity major caliber gun, it would be dependent on a shaped-charge main weapon system, and hence incapable on the battlefield against any opponent whose tanks had Chobham armor.

A third critical factor relating to the proposed light, low-cost tank alternative is the question of life-cycle costs. Despite increasing recognition of the need to consider the life-cycle costs of any proposed weapon system, the GAO report does not address the comparative life cycle costs of a force based on a large number of light tanks.

When we examine the life-cycle cost of this proposed light tank force, we see that it would appear to be higher than the life-cycle cost of the proposed force of main battle tanks. This is because the major element of the total life-cycle cost of any conceivable U.S. tank force will be manpower. Currently, at least 60 percent of the Army's budget goes for personnel costs; in comparison, only 16 percent is devoted to weapons procurement. Sixty-one percent of the cost of an armored division is personnel cost.

A force with a large number of light tanks compared to the planned number of new main battle tanks will inevitably require more personnel than the force already planned. Crew functions, hence crew size, do not diminish in a light tank, so that tank-for-tank there is no personnel saving. Nor is there reason to believe a light tank will require less maintenance than a main battle tank; indeed, lightweight weapons systems often must pay for their lightweight with increased complexity, hence increased maintenance requirements. The *M-551* lightweight tank now in the U.S. Army inventory is a good example.

Thus, it seems that substituting light for heavy tanks would not produce any savings in personnel on a tank-for-tank basis. Since the GAO explicitly calls for a number of light tanks larger than the planned number of main battle tanks, it seems that higher personnel costs would make the proposed GAO alternative more expensive than the planned main battle tank force, if costs are calculated on a life-cycle basis.

The GAO fails to discuss these three weaknesses of the light tank. Each weakness by itself is sufficient to make the light tank a questionable alternative to a new main battle tank at the present time; together they suggest that the light tank is simply not a viable alternative. Only in cases such as the Marine Corps, where weight considerations preclude a sizable force of heavy armor, is there a possibility that a light tank might serve as a potential alternative to a main battle tank.

Alternative No. 3—Continued Use of Existing Tanks and Tank Designs

While the GAO report does not explicitly propose the continued production of *M-60* tanks as a complete alternative

to a new main battle tank, it does suggest the continued viability of the *M-48A5* and the *M-60*, and it does infer that the comparatively low price of the *M-60* makes it an attractive option for the present and the future.

However, we can see, through a careful comparison of the *M-60* tank with the proposed new main battle tank, that the *M-60* is materially inferior. The *M-48A5* in turn, is inferior to the *M-60*.

A critical deficiency of the *M-48A5* and the *M-60* (all models) is in armor. We have already discussed the superior capabilities of Chobham armor compared with existing armor, so it suffices to note that the new main battle tank incorporates this armor, whereas the *M-48* and the *M-60* do not. The armor of the *M-48* and the *M-60* is vulnerable to shaped-charge warheads, and thus to the broad range of battlefield antitank weapons. In contrast, the Chobham armor of the proposed new tank is largely invulnerable to these systems.

Of equal importance is the difference in mobility between the *M-60* and the *M-48* on the one hand, and the new main battle tank contenders on the other. A review of some relevant statistics shows the mobility difference clearly.

	M-48 (A5)	M-60A3	XM-1	Leopard 2AV
Horsepower ⁵	750	750	1,500	1,521
Horsepower per ton ⁵	14.4	13.6	25.9	25.9
Road speed ⁵	30	30	40-50	40-50
Cross-country speed ⁶	12	16	35	?
Acceleration ⁶	12	12.2	6	?

The suspensions of the new main battle tank contenders are of an advanced "hybrid" type. They combine features from many individual types of suspensions and give both a cross-country mobility and an ability to aim the main gun while moving that are far superior to those of the *M-48* and the *M-60*.

One other mobility factor of great importance is the silhouette. The higher a tank's silhouette, the more difficult it is for it to move on the battlefield without being sighted and fired upon by the enemy. The *M-60A3* tank, the latest version of the *M-60*, has a silhouette (height) of 10.8 feet, which exceeds the height of any other main battle tank in the world. In comparison, the *M-60's* Soviet counterpart, the *T-62*, has a silhouette of only 7.82 feet. Both the *XM-1* contenders as well as the *Leopard 2AV* have a silhouette of only 7.5-7.9 feet, a great improvement over the *M-60*.

The superior mobility characteristics of the new main battle tank contenders, particularly the significantly lower silhouette of the new tanks, take on even greater importance when related to current doctrinal developments for U.S. Army armored forces. Depending on the armored doctrine that prevails, tanks can serve in two very different ways. In classic German "blitzkrieg" doctrine, the tank serves primarily as a maneuver unit; its power comes not from its ability to destroy enemy tanks and personnel with its gun, but from its ability, through rapid, broad-scale maneuver, to

create unexpected operational and strategic situations that break the will of the enemy high command. This might be called a maneuver doctrine. The opposite doctrine sees the tank primarily as another piece of artillery, whose most important capability is the destruction of opposing tanks with its gun. Used this way, the tank becomes one more element of what might be called an attrition firepower doctrine.

The most recent doctrine for U.S. Army armored forces emphasizes the attrition firepower approach.⁷ This doctrine has arisen, at least in part, because the Army has had to recognize the mobility weaknesses of the *M-60*, particularly its high silhouette. The vulnerability caused by this high silhouette has forced the Army to avoid exposing its tank more than is absolutely required. Doctrine must attempt to compensate for the design weaknesses of the *M-60*. It does so by recommending that the *M-60* fight primarily from so-called hull-defilade positions, where the tank remains stationary behind a rise in the ground, or is even dug into an excavation. This means that our tanks are not used in the traditional manner, which would make use of their mobility, but rather as stationary antitank guns.

There are, of course, many tactical situations where it is desirable to use tanks in hull-defilade, and the new main battle tank will have a sufficient ability to depress its main gun to be used in defilade at least as effectively as the *M-60*. However, the Army should not be forced to use its tank this way, without any regard for the objective requirements of the battlefield.

Historically, the maneuver doctrine has been more effective than the firepower attrition doctrine, particularly for armored forces. Tanks have always served best as weapons for a tactical and operational offensive. The improved mobility and lower silhouette of the new main battle tank will restore our doctrinal freedom, because the new main battle tank will be much more survivable on the move. This is a consideration of prime importance.

Thus, we see that from the standpoints of protection and of mobility, the new main battle tank contenders are materially superior to the existing *M-48* and *M-60* tanks. What is more, this superiority should permit a substantial improvement in the armor doctrine of the U.S. Army. The GAO did not take these factors fully into account when it suggested increased reliance on existing tank designs as at least a partial alternative to a new main battle tank. Indeed, the GAO report did not consider the doctrinal issue at all. These failures on the part of the GAO are of sufficient importance to raise serious doubts about its recommendations.

Conclusion

In conclusion, we see that none of the three alternatives to a new main battle tank proposed in the GAO report takes all the relevant factors into account. In the light of all these factors, not one of the three alternatives seems to promise a cost-effective, or even a battlefield-effective, replacement for the new main battle tank. Unless further alternatives appear, there is every reason for the United States to proceed as expeditiously as possible in building and deploying a new main battle tank.

⁵From GAO report, Appendix III

⁶From unofficial Army sources. Cross-country speed calculated on basis of Fort Knox medium. Acceleration is seconds required for a 0 to 20 m.p.h., turbine engine assumed in XM-1.

⁷The 15 December 1975 draft of Field Manual 100-5



Standardization?

For approximately 5 years now I have anxiously followed, and at times hopefully contributed to, the development of the requirement, concept, and development of a new tank for the United States Army. While my qualifications to comment with authority are not overwhelming, I have served in and commanded TOE tank units and served at the tank test and evaluation board for a period of approximately 5½ years total. During my posting to the Armor Board, I have tested, analytically evaluated and published results in journals such as *ARMOR Magazine*. For each of the last 5 years, I have commanded a tank and crew through tank gunnery in the U.S. or Europe. Accordingly, I know the *M-60-series* tank reasonably well and feel prepared to comment.

The *M-60-series* tank is a good tank. I'm impressed with its automotive, fire control systems, and tank cannon. I feel so particularly in light of my opportunity to view the tanks of other NATO Armies in action. I would be confident to meet and defeat any enemy with an *M-60-series* tank.

While the *M-60-series* does have shortcomings, the *XM-1*, or General Abrams Tank Program, appears to be progressing well toward the development of a tank that has sustained "state of the art" technology for several decades to come. The program's solicitation of "line tankers" for input has added excitement and confidence to the program. Comprehensive briefing updates have been presented in an enjoyable and informative manner to tankers in Europe. All seemed to be going well. Then one morning I read an article in *Stars and Stripes* (S/S 5 Aug 76) and I feel betrayed!

I am quite literally frustrated at the "Standardization Decision" in reference to the use of the 120-mm smoothbore tank cannon, versus the standard, familiar, rapid fire, rifled and accurate as all hell 105-mm *M-68* tank cannon. The decision in regard to the use of a turbine engine excites me less, as quite frankly I don't feel qualified to comment. Perhaps what disturbs me most thoroughly is the *Stars and Stripes* article's allusion to the fact that the "standardization decision" was not at the behest of the Army that has studied, conceptualized, developed and tested the Abrams Tank candidates, but rather an "other than military decision." In an army that uses dissimilar rifle ammunition from its NATO partners (U.S. *M-15* 5.56-mm vs. NATO

Standard 7.62-mm), I fail to see the benefits that would be reaped from standardization of tank cannons. This is particularly so in light of the fact that the *M-68* 105-mm is a known quantity utilized by several NATO armies and a quite accurate and hard-hitting known quantity at that.

Additionally, standardization with the FRG tanks will be at the expense of our 105-mm *M-60-series* tank inventory, which I am sure will be phased out as the Abrams Tank is phased in. How will we weigh our standardization? Will we standardize with the German 120-mm smooth bore tank cannon or with the UK's rifled version of the 120-mm? In consideration of these facts, is standardization a fact or a buzz word? Let's face it, by the time the *M-60-series* tank is replaced, it will have been around for about 20 years. It is reasonable to expect a similar life for the Abrams Tank. That being the case, my men and I may very well fight with it in combat. It is even conceivable that my yet-to-be-born son would fight with it. My point is that I'm concerned that the weapons system I must rely on not to be compromised in capability in order to accommodate a "historic standardization" that isn't standardization at all. This is serious business!

I don't actually expect any answers to my statements; however, I am submitting this personal opinion to *Stars and Stripes* and *ARMOR Magazine* just for the hell of it. Tankers study their profession and most probably are capable of crewing any tank in the face of an enemy with proper training. But I ask myself the question: if the work, money, and professional efforts expended in the *XM-1/Abrams* Tank Program can be modified with the stroke of a pen, what will come next? I don't believe that General Abrams would approve of another *M-114*, particularly bearing his name. I'll pray for a good tank and trust in my men's ability to destroy the enemy with any tank cannon. God help us tankers and protect us from more modifications to a good tank! "Hybrid" may only be a fancy name for an all too familiar term in the vernacular.

STEPHEN N. MAGYERA, JR.
Captain, Armor

Armored Vehicle Recognition Aids

The following professional thought was extracted from a longer article. The other part of the article contained a proposal for development of an armored recognition kit. Such a kit, consisting of three Training Extension Courses (TEC) lessons, has been developed, produced and distributed by the Armor School. The lessons are described in an article beginning on page 7. ED.

There are still purists who insist that the need to train in recognition and identification is not valid. Their reasoning includes the rationale that the battlefield will be so smoky, dusty, violent, and confusing that the enemy will either be close enough to be identified with ease or will be shooting and thus identify himself. While that reasoning is current

under some circumstances, it hardly accounts for all battlefield situations.

Trainers cannot ignore other battlefield eventualities. Surely it can be assumed that a *TOW* crew properly concealed in a defensive position will have the opportunity to spot an armored vehicle at distances greater than 2,000 meters. The *Sheridan* crew on the border in Europe, the *M-60A2* tank company guarding the Fulda Gap, and the infantry/artillery observer along the DMZ in Korea all might have a chance to spot the enemy at distance in excess of 1,500-2,000 meters. The friendly tank platoon, temporarily disoriented, moving across the front deserves an opportunity to get reoriented before being mistaken for enemy tanks. What about our Allies? Aren't the crews of the panzer battalion on your flank entitled to the knowledge that U.S. soldiers won't confuse German *Leopards* with *T-62s* at long range?

Here are some proposals for improving our vehicle recognition abilities that, although they may not have promise for immediate development, deserve serious consideration.

Photos. An extremely high learning potential can be gained by making photos available for unit display. Photos can easily be color-coded to indicate recognition and vulnerability data. Photos should be made available that show the vehicles at greater ranges and in various positions of defilade rather than the usual shot of a vehicle at close range. Innovative use of photos can provide a "learning on the sly" capability. Placed in service clubs, dayrooms, dining facilities, etc., they'll provide a topic for discussion as well as assist the soldier in becoming recognition conscious.

Improve existing Graphic Training Aids (GTA's). The GTA's currently available depict the armored vehicle in silhouette form and in "parade ground configuration." GTA's are required that depict various vehicles at greater ranges and under varying degrees of obscurity. The GTA's need not be expensive or particularly large. A variation of a Canadian-type can be produced inexpensively for extensive distribution.



Models. Recognizing the fragility and expense of plastic models, greater emphasis should be placed on reproduction of wood models. These wood models need not be produced to duplicate the detail that is common in commercial plastic models. Wood models could be inexpensively produced that would adequately depict distinct turret and hull configura-

tion. The models should be approximately 12" long and 6" high and could be produced with detachable turrets for ease of storage and transporting. A kit of approximately 12-15 tanks in a wooden storage box could be issued from TASOs. The vehicles could be displayed, used as part of other sandtable training, or used for identification and recognition classes.

Realistic targets. The standard plywood panel on tank ranges should be cut to resemble various potential enemy vehicles. The silhouettes need not be exact, but should generally depict the same outline as the actual vehicle.

Publication of an Identification and Recognition Manual. Several NATO nations recognize the importance of the subject and have created training manuals exclusively for the purpose of increasing proficiency in armored vehicle identification and recognition. There is a need to develop a coordinated publication approved by TRADOC. The existing manuals from other friendly nations are good, but they could easily be improved. A standard manual for use as an adjunctive training aid to TEC, GET's, and film clips would be of considerable value. The manuals would serve to make the soldier recognition conscious and would teach both the basic principles governing vehicle recognition and the characteristics of the various types likely to be encountered on the battlefield.

Game Device. The interest and improvement of recognition skills of all soldiers could be gained by making recognition fun. Either a 35-mm slide audio-synchronized program or a TV system in the form of a "shooting gallery" as found in amusement parks could be developed. These machines would utilize pinball like scoring systems and soldiers would score on correct vehicle identification and target hits. Scores would be tabulated electronically and hits and correct identification responses would increase the score. Placed in service clubs and unit dayrooms such machines have unlimited potential.

Professional Journals. As a minimum, *ARMOR*, *Infantry*, *Aviation Digest*, and *Soldiers* magazines should regularly contain a section pertaining to identification and recognition of armored vehicles. The format of each issue could vary from a general orientation of a specific vehicle as it enters the system of a particular Army, (such as the *M-60A2*) to a recognition quiz pertaining to several vehicles. Each issue, would, in itself become a valuable training aid for further utilization at the unit level. Some consideration should be given to publishing the same article each month in the four separate magazines.

Tank identification and recognition should be a subject that provides continuous exposure to the soldier. It must not rely solely on any single medium. Soldiers should see friendly and enemy silhouettes, models, photos, films, mockups, charts, etc. from AIT through ARTEP. The Armor doctrine of obtaining a first round kill can only be valid when that round is directed toward the enemy. Let's not wait any longer to train our soldiers in recognition and identification of armored vehicles.

Beginning with this issue, ARMOR will feature an armored vehicle recognition quiz. The first of the series appears on page 39. ED.

JOHN R. FISKE
Lieutenant Colonel, Armor
U.S. Army SGM Academy

THE

SENIOR TROOPER

The command sergeant major (CSM) is the most knowledgeable and experienced soldier in the battalion. He has abilities and expertise in many areas, but often he may be under utilized. Some commanders may be reluctant, because of all this knowledge and experience, to ask for his assistance, and thus properly employ this valuable personnel asset.

What does or can the CSM do?

First of all, he does not *command* anything, but should be involved in everything. Every change, every order, every activity within the battalion affects the troopers, therefore, the senior trooper *must know* about them. The senior trooper is just that—the man with the most experience who can make things run smoother. *Any* turbulence causes soldiers a loss of efficiency. We can preclude a lot of this by keeping the CSM informed.

At times it's best for the commander and his CSM to travel together, however, 90 percent of the time they should go their separate ways. Two sets of eyes, ears, and hands in any area of operation are better than one. The mission of the command, commander, and CSM are identical.

The CSM does not compete with his commander, but rather he supports him 100 percent. The CSM is honest in everything; discreet and tactful. The leadership chain between himself and the first sergeants (1SGTs) must be solid and it must ensure the accomplishment of all tasks without reference to the chain of command for *orders*. Thus, the CSM's ability to communicate the Commander's orders should be professionally stated and swiftly responded to. In this he needs *only once* for his commander to state to both staff and subordinate commanders, how he (the commander) desires them to respond to advice from the CSM (*"This is my right-hand guy, listen to him because he's got it all together."*)

It's imperative that the commander and CSM have a couple of 15-minute periods each day in which to converse and confide with each other. No one has all the answers regardless of their experience and knowledge.

We tend to get carried away with detailed job descriptions. AR 611-201 is adequate, but when writing a detailed description of a job, it often times becomes an all-inclusive check list—and checklists are detrimental. They smother initiative and innovation. Some of my contemporaries do not, however, agree with me—they'd like a checklist so that they can go home early or maybe not come in at all.

The most important function of the CSM's role in training

is that of training the trainers, i.e. subordinate NCO's and also officers within the battalion. Advising and teaching are not synonymous. His abilities in identifying the problem and in resolving it must be his strongest trait.

His personal interest in schooling, both within and outside the unit, is a must. Teaching through personal example is the most effective method. No one minds checking training on bright sunny days when the temperature is 80°-85°. However, the most effective times for inspecting training are at night, when it's wet and cold, or during extremely hot periods.

During combat or peacetime pressure periods, the CSM's place is with the troops. No CSM should ever be left behind when the troopers are tactical. His place is in the field. Free advice is just that—*free*! Sharing knowledge and experience, in both the tactical and cantonment areas, with subordinate NCO's strengthens the entire command.

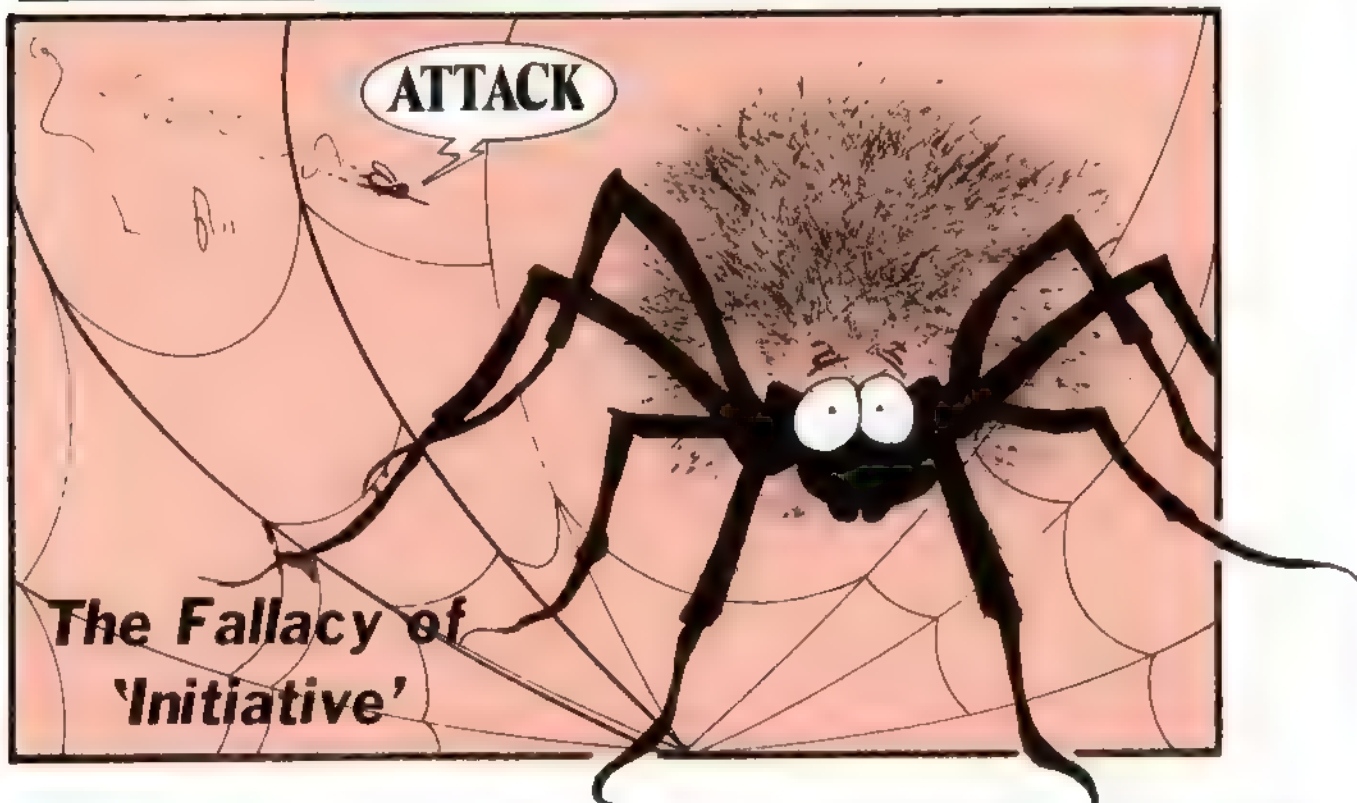
CSM's must be the devil's advocate on policy. What effect will this directive have? Is it dumb? Harmful? Some of us interpret this advocate business as being negative. In fact, it can be negative and it has appalling effects when policies are challenged in the wrong place at the wrong time. Discretion, tact, and questioning go together.

I've assiduously avoided mentioning adherence to standards, haircuts, police call, and courtesy because these are functions which go on *concurrently* with teaching and are *second* nature to all soldiers. (In other words, if these standards have to be defined for the CSM, he's in the wrong business and most assuredly at the wrong grade!)

Little recognized and never stated is the CSM's role in establishing a wholesome social life within the unit. His wife and family are also part of the unit and have responsibilities in this regard. His family must be "All Army." He must be willing to spend extra time in community activities such as the church, dependent youth activities (DYA), and schools. He must know how to give advice regarding the services that are available to the troops, such as transportation, chaplain, Red Cross Army Emergency Relief (AER), hospital, post exchange (PX), and commissary.

There should be virtually nothing the CSM cannot do and do well in all areas of leadership—if he doesn't, *he should be relieved—IN A HEART BEAT!*

WALTER W. KRUEGER
Command Sergeant Major
1st Cavalry Division



Said the commander to his subordinates, "Take the initiative—ATTACK!!!"

I'm no Clausewitz, but take my word for it — *attack* and *initiative* are not synonymous; and yet, that's exactly what our philosophy of war teaches. You don't believe that? Let me quote Armor's own FM 71-1, chap 4, para 4-1: "The Attacker Has the Initiative."

Gol-darn-it, that just isn't true. It's a cliché that has been taught to our troops since BC (Before Cook), and the time has come to refute that erroneous and misleading "truth" (I'm retiring — that's why it's time)

The implication is—offensive action *automatically* provides the attacker with the initiative. In truth, going into attack merely gives the attacker *an opportunity* to gain the initiative. He can fail, you know.

So, what does initiative, in war parlance, mean? It means: "the power to introduce and sustain a new course of action." (Webster's unabridged). And, that definition applies to both the offense and the defense.

For example, who had the initiative when the Light Brigade charged into the valley of death? I think we could equate that action to the spider and the fly—come into my web, said the spider to the fly. In those two cases, who had the initiative? In both instances, it certainly wasn't the attacker, unless, of course, we agree that *initiative and defeat are synonymous*—which makes as much sense as saying *attack and initiative are synonymous*.

Take a look at Armor's own active defense. Here we entice the attacking enemy onto a killing ground (fly and spider concept). Who has the initiative, the attacker or the defender? The defender, because the active defense concept forces the attacker into a pre-determined killing area, thus, the defense *controls the action*, and controlling the action is the measuring stick that determines who has the initiative.

True, the active defense strike force attacks the enemy at the appropriate time, but this merely *sustains* the course of action (remember the definition of initiative: "the power to introduce and sustain a new course of action.")

Those readers who are not familiar with the "Charge of the Light Brigade" may recall Colonel Custer's encounter with the Indians at Little Big Horn. Colonel Custer took the initiative by attacking and "initiated" the worst military defeat in our history. No, I am not pointing the finger of scorn at that brave officer; but, the Indians had him in their hip pocket all the way. Again, this illustrates my contention that attacking only gives the attacker *an opportunity to gain* the initiative; that "attack" and "initiative" are not synonymous as implied—no, not implied, but stated as a fact—in FM 71-1.

Then, of course, we have Napoleon's move into Russia. His attack was practically an administrative march, except for now-and-then forays by the retreating Russians to hamper his movement. Although "Nappy" marched 1,000 miles through Russia, he never had the initiative—his army was absorbed by Russia (spider and the fly again).

The Russians didn't even attempt to drive the French out of Moscow—they didn't have to. Napoleon *retreated* from Moscow on his own "initiative." (Oh'h'h—not funny, huh? Gosh, I thought it had—a sort of flair).

Well, so much for "The Attacker Has the Initiative." (Are you listening FM 71-1?)

So, my compatriots (if I have any left after this exposé), you'll find me in my bomb shelter awaiting your assaults for the blasphemy I've fostered on a time honored—though fallacious—military credo.

JOHN COOK
Lieutenant Colonel, Retired

Another Mission for the CSC Commander

by Captain William F. Greer

With the H-Series reorganization complete, commanders are still seeking guidance on the methods and techniques of employment of the Combat Support Company (CSC). With little in the way of published doctrine available, they are largely dependent upon the experiences of other units, experimentation, and their own imagination. With this in mind, the following is one idea currently in practice in the 2d Battalion, 33d Armor (Tigers), 3d Armored Division, that may serve to stimulate additional thought and discussion on the employment of the CSC command structure.

Prior to discussing the new mission for the CSC Commander, we must first discuss some old ideas on service support. According to doctrine for support of a unit in combat, we group the combat support elements into *trains* according to the tactical situation. A *train* is a grouping of personnel, equipment, and vehicles necessary to provide logistical support to a unit. Trains are established at company, battalion and brigade level.

The battalion organizes its logistical resources into Combat and Field Trains. Using this echelonment, the required immediate logistical support is placed well forward in the battalion area. This forward element, the Combat Trains, has the mission of immediate responsive support to the forward companies. The remainder of the logistical resources are placed in the Field Trains. The Field Trains are located in the brigade trains area.

The traditional mission of the battalion S-4, in a combat environment, is to command the Combat Trains and leave the Field Trains to the Support Platoon Leader or the Property Book Officer.

The foregoing is essentially all that has been written about trains operations. There are a few variations, but all give the same information. There are no concrete definitive answers about the trains operation.

The degree of emphasis toward logistics is demonstrated by the fact that in an Armor battalion we place four men in a tank and publish TM's, FM's, TC's, TEC Films, "Helpful Hints," etc. on shooting the weapon and maneuvering in combat. What is ironic about this is that we find fewer paragraphs written for the multitude of supporting personnel than for the one man behind the trigger; without supporting personnel, he would have nothing to shoot. This situation is further demonstrated by a Readers' Opinion Poll in the July-August 1975 edition of *ARMOR* Magazine. This poll showed that while 81 percent of the readers enjoyed reading

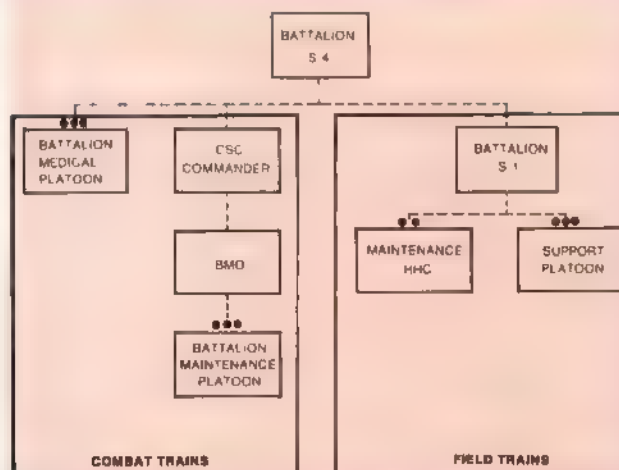
articles on Operations, 75 percent *did not* enjoy articles on Logistics and Maintenance.

Well armed with the wealth of knowledge provided by the five paragraphs on Trains Operations in FM 17-1, I set out to write a Logistics Field SOP and prepare the battalion trains elements for an upcoming Battalion Test at Hohenfels, FRG. The first thing I found was that battalion had *never* operated for extended periods with echeloned trains, and therefore, the only "experience factor" available was FM 17-1.

When I presented the "Logistics Field SOP" to the battalion commander for review and approval, he asked me a startling question — "What is the CSC Commander doing?" The CSC Commander? What does he have to do with logistics? Why, Combat Support Company is not even mentioned in those five paragraphs on Logistics.

The more I thought about CSC, the more it became evident that an important element had been overlooked. The TOE of CSC has given us a control headquarters identical to that of a line company. Why not use it as such? With the likelihood of the company elements attached to other units, conducting several missions simultaneously over extended areas, the command structure remains intact. This command structure could be located with the TOC where the CSC Commander becomes another TOC officer or located with the Combat Trains. Is not the Combat Trains designated as the alternate TOC? The CSC communications track has the capability to monitor not only its company frequency but also the battalion command net and the Admin/Log Net. This capability is further complimented by the fact that CSC is authorized, by TOE, the cipher capability not found in the S-1/S-4 track. The CSC commander is constantly aware of the tactical situation by monitoring his combat support elements (Scouts, Mortars, GSR, *Redeye*) and has the current logistical situation by operating a BLOC (Forward). Further, the CSC commander must be located behind the Battalion front and somewhere centrally positioned to support his deployed elements. This is generally where one would position the Combat Trains.

Accordingly, the Field SOP was rewritten with the following structure and a training program was initiated to introduce this new trains structure



The TFTE/ORTT was conducted using the structure as shown in the previous "wiring" diagram. "Logistics support of the battalion during the TFTE/ORTT was ... professionally conducted ..." with much support from the FAST. Immediate logistical support from the Combat Trains was enhanced by the CSC communications in direct contact

I am reminded of the rhyme "... for want of a horse ...". The horse *and* the shoe were provided by a logistician.

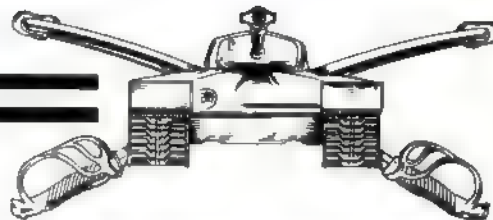


CPT WILLIAM F. GREER entered active duty in 1961. A distinguished graduate of Armor OCS in 1967 and a graduate of AOAC in 1970, he has served as a cavalry platoon leader, troop commander, and squadron S-3 in Germany, an Infantry battalion S-2 in Vietnam, and an AFES commander in Harrisburg, PA. A 1974 graduate of Elizabethtown College, Captain Greer is currently serving as S-4, 2d Bn, 33d Armor, 3d Armored Division.

STATEMENT OF CIRCULATION

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OPMD - EPMD ARMOR



The following lists include all Armor officers in Brigade and Battalion/Squadron level commands as of December 1976. Even as this goes to press we recognize that some of these names may have already changed. Please bear with us! We plan to provide periodic updates of this listing.

ARMOR OFFICERS IN COMMAND OF BRIGADE/REGIMENTS as of Dec 76

COL Thurman E. Anderson 1st Brigade, 1st Armored Division	COL Douglas S. Smith 1st Brigade, 3d Infantry Division	COL Dave R. Palmer 1st Brigade, 2d Armored Division	COL Bobby J. Maddox 8th Air Cavalry Brigade
COL Roger J. Price 2nd Brigade, 1st Armored Division	COL Richard G. Graves 3d Brigade, 8th Infantry Division	COL James L. Dozier 2d Brigade, 2d Armored Division	COL Leslie A. Layne 3d Brigade, 4th Infantry Division (M)
COL Dale A. Vessam 1st Brigade, 3d Armored Division	COL Harold R. Page 2d Armored Cavalry Regiment	COL Gerald T. Bartlett 1st Brigade, 1st Cavalry Division	COL Thomas E. Williams 1st Training Brigade, Ft. Knox
COL Thomas E. Carpenter, III 3d Brigade, 3d Armored Division	COL Croasie E. Saint 11th Armored Cavalry Regiment	COL Marvin G. O'Connell 2d Brigade, 1st Cavalry Division	COL James M. Hetherly 194th Armor Brigade, Ft. Knox
COL Graff Brookshire 3d Armored Cavalry Regiment			

BATTALION/SQUADRON COMMANDERS as of Dec 76

LTC Dennis P. Malcor 1st Squadron, 2d ACR	LTC John A. Dennis 3d Battalion, 32d Armor	LTC Geary D. Martin 4th Squadron, 12th Cavalry	LTC Martin Plassmayer 3d Battalion, 67th Armor	LTC William Boice 2d Battalion, 34th Armor
LTC Ronald C. Estep 2d Squadron, 2d ACR	LTC Thomas C. Foley 1st Battalion, 33d Armor	LTC Frederick Stanley 1st Battalion, 6th Brigade	LTC Richard Betters 2d Squadron, 6th Cavalry	LTC Frederick J. Filbert 1st Battalion, 70th Armor
LTC William Wilson 3d Squadron, 2d ACR	LTC Gordon B. Rogers 2d Battalion, 33d Armor	LTC Vernon B. Starley 6th Battalion, 3d Brigade	LTC Allen F. Stebbins 4th Battalion, 37th Armor	LTC Calvin A. Waller 1st Battalion, 77th Armor
LTC David M. Maddox 1st Squadron, 11th ACR	LTC John E. Swindells 3d Battalion, 33d Armor	LTC William Ward 12th Battalion, 4th Brigade	LTC Philip L. Yeats 1st Battalion School Troops	LTC James V. Wasson 4th Battalion, 40th Armor
LTC John C. Glibreath 2d Squadron, 11th ACR	LTC Edward Bagdonas 3d Squadron, 7th Cavalry	LTC Richard R. Maglin 1st Battalion, 1st Brigade	LTC Jerry L. Fleming 2d Battalion, School Troops	LTC Rodney D. Wolfe 1st Squadron, 9th Cavalry
LTC Jack W. Dice 3d Squadron, 11th ACR	LTC Nathaniel F. Colby 1st Battalion, 64th Armor	LTC William Hill 2d Battalion, 1st Brigade	LTC William Ivey 5th Battalion, 33d Battalion	LTC David H. Andre 1st Battalion, 7th Cavalry
LTC William G. Yarborough 1st Squadron, 1st Cavalry	LTC James E. Diericks 2d Battalion, 64th Armor	LTC Stanley A. Maxson 3d Battalion, 1st Brigade	LTC William Gunter 2d Battalion, 77th Armor	LTC Dyson R. Miller 2d Battalion, 6th Cavalry
LTC John B. Atwood 1st Battalion, 35th Armor	LTC Robert Carter 4th Battalion, 64th Armor	LTC Michael H. Crumley 6th Recon Squadron, 1st Bde	LTC Gary P. Bergeron 1st Squadron, 4th Cavalry	LTC Champlin F. Buck 2d Battalion, 6th Cavalry
LTC Leonard Nowak 3d Battalion, 35th Armor	LTC Duane K. Root 3d Battalion, 64th Armor	LTC Victor S. Vierra USA Support Group,	LTC Richard R. Russell 1st Battalion, 63d Armor	LTC Homer M. Ledbetter 1st Battalion, 8th Cavalry
LTC William Fitzgerald 1st Battalion, 13th Armor	LTC Shaun T. Malloy 4th Battalion, 69th Armor	LTC Robert W. Demont 16th Battalion, 4th Brigade	LTC Charles A. Woodbeck 2d Battalion, 63d Armor	LTC Donald B. Adkins 1st Squadron, 17th Air Cavalry
LTC Herbert Diatelfano 1st Battalion, 37th Armor	LTC Glenn Carr 3d Squadron, 8th Cavalry	LTC William Stofft 16th Battalion, 4th Brigade	LTC William D. Corlies 4th Battalion, 63d Armor	LTC Garry F. Dollin 7th Squadron, 17th Air Cavalry (Attack Helicopter)
LTC Charles Richardson 2d Battalion, 37th Armor	LTC Dick Hopkins 1st Battalion, 68th Armor	LTC Guy H. Heath 18th Battalion, 5th Brigade	LTC Herman V. Ivey 2d Battalion, 69th Armor	LTC Philip Mean 4th Squadron, 9th Air Cavalry
LTC Richard Griffiths 2d Battalion, 61st Armor	LTC Gordon E. Wilson 2d Battalion, 68th Armor	LTC Frederick Wilmoth 2d Battalion, 2d Brigade	LTC Frederick M. Franks 1st Squadron, 3d ACR	LTC James S. Hahn 4th Squadron, 7th Air Cavalry
LTC Stanley M. Kanerowski, Jr. 3d Battalion, 63d Armor	LTC Paul R. Schwartz 3d Battalion, 68th Armor	LTC John H. Mayer 2d Squadron, 1st Cavalry	LTC Byron Marsh 2d Squadron, 3d ACR	LTC Thomas H. Harvey 3d Squadron, 4th Air Cavalry
LTC Richard Kolaschski 4th Battalion, 73d Armor	LTC John H. Elliot 5th Battalion, 68th Armor	LTC Julian C. Simerly 1st Battalion, 68th Armor	John B. Dahill 3d Squadron, 3d ACR	LTC Charles E. Ivey 2d Squadron, 9th Air Cavalry
LTC William Good 3d Squadron, 12th Cavalry	LTC Charles D. McGaw 1st Battalion, 72d Armor	LTC Michael A. Vargoako 2d Battalion, 68th Armor	LTC David G. Moore 4th Battalion, 68th Armor	LTC Gary E. Luck 2d Squadron, 17th Air Cavalry
LTC Ronald H. Griffith 1st Battalion, 32d Armor	LTC Frank M. Alley 1st Battalion, 40th Armor	LTC Andrew P. O'Meara 1st Battalion, 67th Armor	LTC William Gillette 1st Squadron, 10th Cavalry	LTC Robert L. Phillips 3d Squadron, 5th Air Cavalry
LTC Richard C. Swain 2d Battalion, 32d Armor	LTC William C. Allison 3d Battalion, 77th Armor	LTC Glenn O. Ryburn 2d Battalion, 67th Armor	LTC Felix M. Delumpa 6th Battalion, 32d Armor	LTC Wilbert W. Sorenson 2d Squadron, 10th Air Cavalry

Paper Prisons

The great and remembered periods of human history seem, invariably, to revolve around the rise, actions, and legacies of great men. Be they kings or warriors, philosophers, statesmen, or scientists, the ebb and flow of our species has been dictated, perhaps more so than by any other single factor, by the emergence of the leader.

The relevance of leadership to the military establishment should be obvious. All the scientists and technicians can do is provide us with the machines, but it is still men who must put them into action and produce results with them. As long as men work together toward a common goal, the importance of the leader will never diminish. Recent trends have not reduced the role of the leaders, but rather have imposed a great demand for their technical proficiency. But what of the question of the level of leadership found in the military today—will it be able to measure up or not? It is important to act on our hunches now; for by the time we are able to prove them, it may be too late to do anything about them.

We must, of course, address the matter of adequacy of military leadership in terms of military success. Military success is achieved through the relatively superior employment of combat power in battle. Combat power, in turn, is basically comprised of two components: material resources and psychological resources. The first of these is concerned with the quantity and quality of tangible assets such as weapons, munitions, troops, and a myriad of support materials. The latter component, however, is concerned with the intangible and often indescribable energies and abilities of the inner being. A leader must be skilled in handling the former, but he must be a master in directing the latter. Again, the reason for this is clear—machines do not fight, men do. A commander must count on having, at times, to fight an enemy who is superior to him in those tangible assets. If one is to beat a materially superior foe, it must be accomplished through the all-out mobilization of inner energies. The greater the material disadvantage, the more crucial is the role of the leader.

Today, the U.S. military faces a grave situation, and, accordingly, so does the nation. For various reasons, the U.S. Government has effectively resolved that we shall not possess a definite material superiority over our enemies in the military sphere. In fact, many military authorities believe just one of those enemies, the Soviet Union alone, has at least equaled us in almost every major area of material military resources and surpassed us in many. It is unfortunate, at least, that such a situation has been allowed to develop, and years to come may prove it to be much worse than merely unfortunate. The military, however, must work with what it is given;

and if it has been resolved that we will not be granted superiority in material resources then we must emphasize those intangible, psychological resources. In short, a premium has been placed on proficiency and leadership.

If this were all there is to the problem, then our situation would be tenuous but not yet grave. There is, however, another element which conspires with the first to frustrate the efforts of our military leaders—"misplaced priorities." These misplaced priorities, which affect both allocations of finances and personnel combined with our inadequate material resources form a virtually insurmountable obstacle to combat preparedness. The most devastating thing is that most of it is beyond the military's power to resolve.

From the perspective of this company grade officer, the greatest leadership problem we face presently, and are likely to face for the next several years, is a lack of leadership from above. This applies, in part, to the military establishment but is more directly aimed at the government itself. In spite of some opinions to the contrary within governmental circles, the "government," on the whole, has decided to accept a situation of military parity with our enemies. It is virtually impossible to determine if parity has been achieved due to the secretive nature of nations' military preparations. If you appear to be at a level of relative equivalence based on what you can see, you may, in fact, be at a substantial disadvantage due to what you can't see. Additionally, this parity is based on a comparison of our might with that of our single, most obvious adversary—the Soviet Union. It does not consider our strength in relation to possible Soviet alliances. The formula used to determine parity is, at best, questionable. We are at a decided disadvantage in many quantitative criteria and whether the qualitative edge we have in other areas is enough to make up the difference is open to conjecture.

The policy of parity is closely linked with economic considerations. Whether the policy of parity is a necessary result of budgetary constraints or whether the budget is determined based on a calculation of what is necessary to maintain parity is really an abstract, academic consideration. The only thing that really matters is that we don't have sufficient funds. Regardless of where the money is going, not nearly enough is going to the lowest levels where the actual troop training is going on. There seems to be an emphasis on computerization and sophisticated systems and machinery to support the combatants. That is all well and good, unless it happens at the expense of the combat troops, which seems to be the case. It appears that we have been taken up with the construction of an awesome

support capability which no one really knows how to work. This is not to say that we should slacken our efforts to provide the fighting forces with the best support available. We must ensure, though, that our troop training remains abreast of our technological advances; we must guarantee a sufficient and proficient fighting force. Right now, that fighting force is neither sufficient nor proficient, and one of the key factors in that deficiency is a lack of adequate funding.

The problem of inadequate funding is bad enough by itself, but it has been augmented by the additional problem of misplaced priorities. When resources are in short supply, the establishment of priorities is critical.

We, in the military, however, have been tasked not only with the responsibility of building and maintaining the most essential element of our national security, we have simultaneously been burdened with carrying through a number of programs of questionable value. It appears there are some inspired, yet misguided, individuals in both the military and government who have discovered the "captured audience" aspects of the military establishment and seek to exploit that quality to try out some of their own pet programs for social betterment. As such, the military has become a virtual laboratory for social scientific experimentation, and we members of the armed forces have become human guinea pigs. This process has taken place in many fields from education to drug and alcohol abuse to interpersonal relationships. It is not that the intent or aims of these programs are wrong, but their practical implementation has placed a tremendous strain, especially on lower leaders, and, inevitably, takes place at the expense of mission-oriented training. It is also questionable whether many of these programs really accomplish their goals or, at least, if they accomplish them in the most suitable fashion. It is essential that commanders at all levels be concerned with the well-being of their troops, but I am here reminded of the advice of Field Marshal Erwin Rommel that the best form of welfare for the troops is first-class combat training. If present trends persist in that these extraneous programs continue to proliferate and devour more and more time, money, and personnel—all at the expense of combat training—we may discover in the next war that we possess the best educated, most socially and psychologically well-adjusted body-bag stuffers in the world. It is not that the aims of these programs should

be ignored. I think, though, that many would be surprised at the large number of these problems that would take care of themselves if we simply tended to our business and concentrated on and devoted our energies to the perfection of our trade. Many of our greatest problems arise from the tedium of garrison, not the rigors of the field.

We, at the company grade level, suffer from a combination of insufficient funds and misplaced priorities, which misdirect and squander what funds are available. This system has, in turn, ossified and become self-perpetuating in that commanders are evaluated heavily on how well they execute these misguided programs and priorities and are promoted accordingly. All too infrequently is a leader evaluated on how tactically proficient he is; but he is scrutinized daily on how well he services the ever-growing myriad of extraneous programs and how good his paperwork is. Accordingly, the bureaucratic mentality is given precedence over that of the field commander. The new young leader entering this system is not given an adequate chance to develop his skills. He is bound and smothered in a paper prison, and all his efforts to break out and do what a military leader is supposed to do are blocked by the very people—his superiors—who should be giving him whatever support and guidance he needs.

Now, when we need hard-nosed, determined, and well-directed leadership the most, we are bound by a system and its administrators which can only approach a spineless mediocrity at best. The greatest leadership problem we will face for the next several years is quite simply a lack of leadership, especially in high circles. This applies to the military, but, to a much greater degree, it applies to the government which determines what kind of resources the military shall have and toward what aims it shall direct its efforts. A prime responsibility of leadership is to set the example, and we in the military must look to the government to set an example which facilitates the accomplishment of our mission; namely, to defend this nation and its values against all enemies both foreign and domestic. We take this responsibility freely, but, by God, we must be given a chance to fulfill it.

Condensed from an article by Lieutenant Lawrence P. Hebron in the June 1976 issue of U.S. Naval Institute Proceedings.

A Threat to Army Aviation's Support Role

One substantive tie that always held an Army aviator to the philosophy of support for the ground soldier has been his basic branch. Under the recent decision to break that tie, it becomes very possible that the per-

sonal orientation of commissioned aviators will change from a ground orientation to an infatuation with flying for flying's sake.

The past has shown us that the tendency to separate-

ness for airmen does exist. There are still other factors which foreshadow the reoccurrence of this unfortunate trend.

Agitation for a separate aviation branch has often surfaced in the past and in recent months has surfaced again. A separate aviation branch is undesirable to me, and I think to most others in the Army, for reasons often stated and not to be repeated here.

But quite frankly, to remove the meaning behind an officer's branch insignia is the first step toward replacing that insignia with something else that is meaningful—perhaps the wings and propeller of the old Army Air Corps.

Despite assurances that the "flying club" syndrome will not be allowed to arise in the future, we can expect to see just such attitudes develop among our commissioned aviators. The Army must begin to consider how it will deal with subtle trends as well as outright moves to separate the "grunt" from the flying soldier:

- First of all, the ground branches with proponency for certain aviation functions must take a more active interest in three-dimensional warfare.

The ground branches should provide constant pressure on aviators and on the Army Aviation Center and School to contribute to the development of the three-dimensional battlefield. There must be a genuine cooperation between doctrinal and tactical planners, both air and ground.

It is in the national interest to consider such "radical" ideas as air-to-air combat among helicopters. If the

branches cannot find time to consider all of possibilities for aviation, then aviators will do it themselves, separately.

- Aviators must be required to stay current in the doctrine and practice of land warfare. This will appear easy for a while. Many commissioned aviators, probably the majority, still cling to the old philosophy of support. We may have a real problem when this generation passes, however, barring another war which will again bring us to see the validity of our doctrine.

- Lastly, the Department of the Army should reconsider its decision to remove aviators from their combat arms branches. Aviation should be an officer career specialty, but an aviator should retain his basic branch and he should be forced to demonstrate proficiency therein.

It is his anchor, his tie to the reality that organic aviation is just another tool of the ground commander, and that the Army aviator is, in fact, a double-duty soldier.

In my opinion, when aviators become remote from the combat arms, when the insignia they wear becomes meaningless, it will not be long before the quality of aviation support will deteriorate. The rapport between the "grunt" and the "flying grunt," which took so long to build, will be gone. It happened between the world wars and it can happen again.

From an article by Major David H. Price in Army Magazine—July 1976. Copyright 1976 by the Association of the U.S. Army and reproduced by permission.

Radio Silence

Planning Is The Key

If we are to reduce our overreliance on electrical communications during tactical operations, we must stop substituting communications for planning. We must insure that subordinate commanders are thoroughly "read in" on the entire plan. If the company commander knows not only his first mission and/or objective, but also knows what his subsequent mission(s) may be, then he can continue to fight even when radio communication with battalion is disrupted.

Hand-in-hand with good planning goes the old concept of letting commanders command. Another expression for this is "delegate authority." Once the battalion commander has briefed his company commanders on the tactical plan and given them their missions, he must trust them to accomplish those missions. The same is true of the brigade commander and his battalion commanders. This means, among other things, that we do not require a subordinate commander to report, by radio, that he has done what the operations order (OPORD) told him to do.

In effect, a commander must have sufficient faith in his subordinates to assume they are doing their jobs, unless they report otherwise. If a battalion commander has a company commander whom he cannot trust in

this way, he should get a new company commander. Likewise, if a battalion commander is unwilling to trust any of his company commanders, and uses his radio to direct their every move, then what is needed is a new battalion commander!

Thoughts on using the radio to oversupervise aside, there is a "test" which can be applied to determine whether or not to send a message by radio. Does the message require an immediate action or response by the headquarters receiving it? If it doesn't, as in the case of a company commander telling the battalion commander "I'm complying with the OPORD," then it doesn't have to go by radio.

Units must practice operating under radio silence. We must take a page from the enemy's training manual and start doing what he does as well, if not better, than he. This must start at small unit level, say rifle squad, but we should have as a goal practicing it with tank battalions. Maneuvering battalion-sized units under radio silence is possible, and we should approach such training with this in mind.

Extracted from an article by Major Walter B. Heffner in the summer 1976 edition of Army Communicator

MBT LEOPARD 2 AV FOR NATO?

The following commentary was extracted verbatim from the June-July 1976 issue of NATO's FIFTEEN NATIONS. It in no way reflects the views of the Department of the Army or the U.S. Army Armor School. Reprinted by permission.

The forthcoming evaluation, or to be blunt, the preconceived Barnum circus style of affair between the *XM-1* and *Leopard 2 AV*, puts in the limelight the Federal Republic of Germany's own main battle tank problems in a brand-new European context.

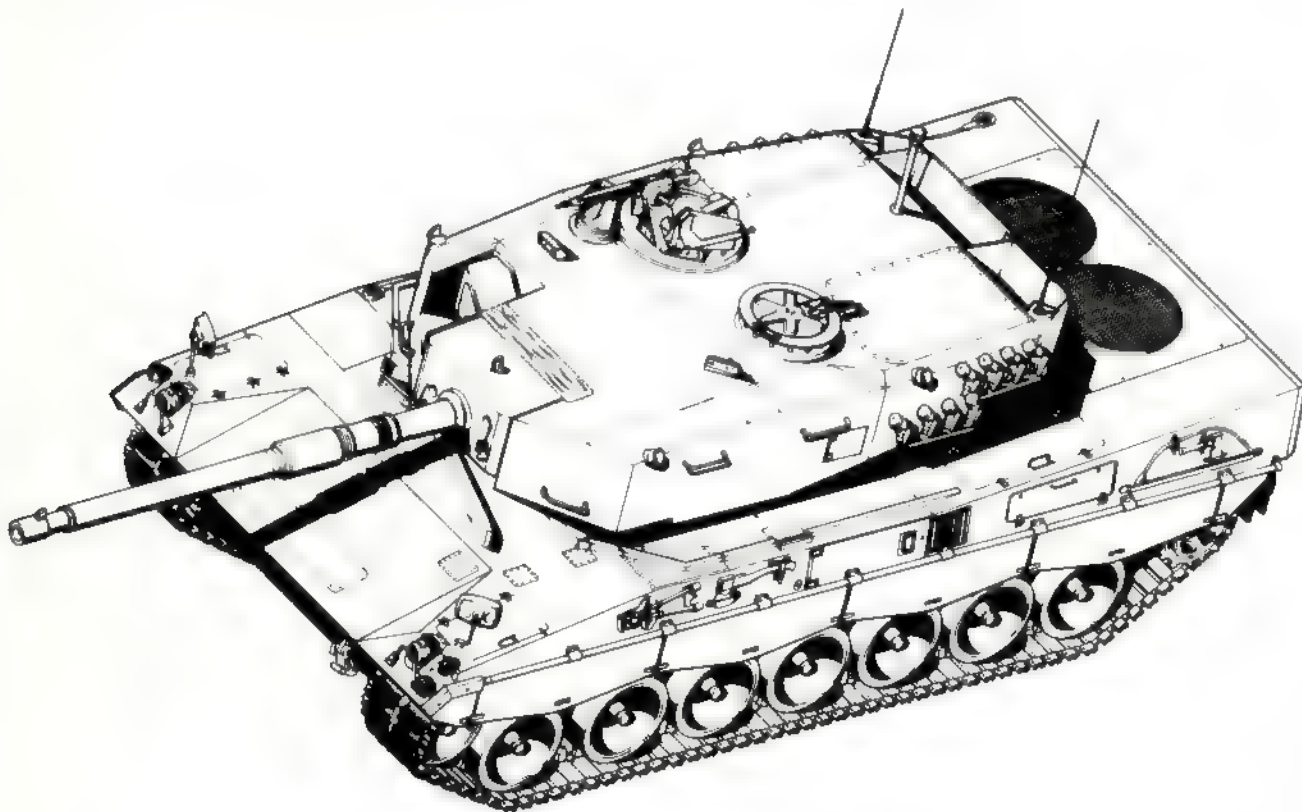
Firstly, German High Command seems to be determined to definitely procure the *Leopard 2*, armed with the 120-mm gun weapon system. Whichever way one analyzes the U.S. Army predisposition or timing, the German Army has to cope with a crucial tactical situation along a 1,500-kilometer borderline, as Central Europe is confronted with a disquieting widened gap.

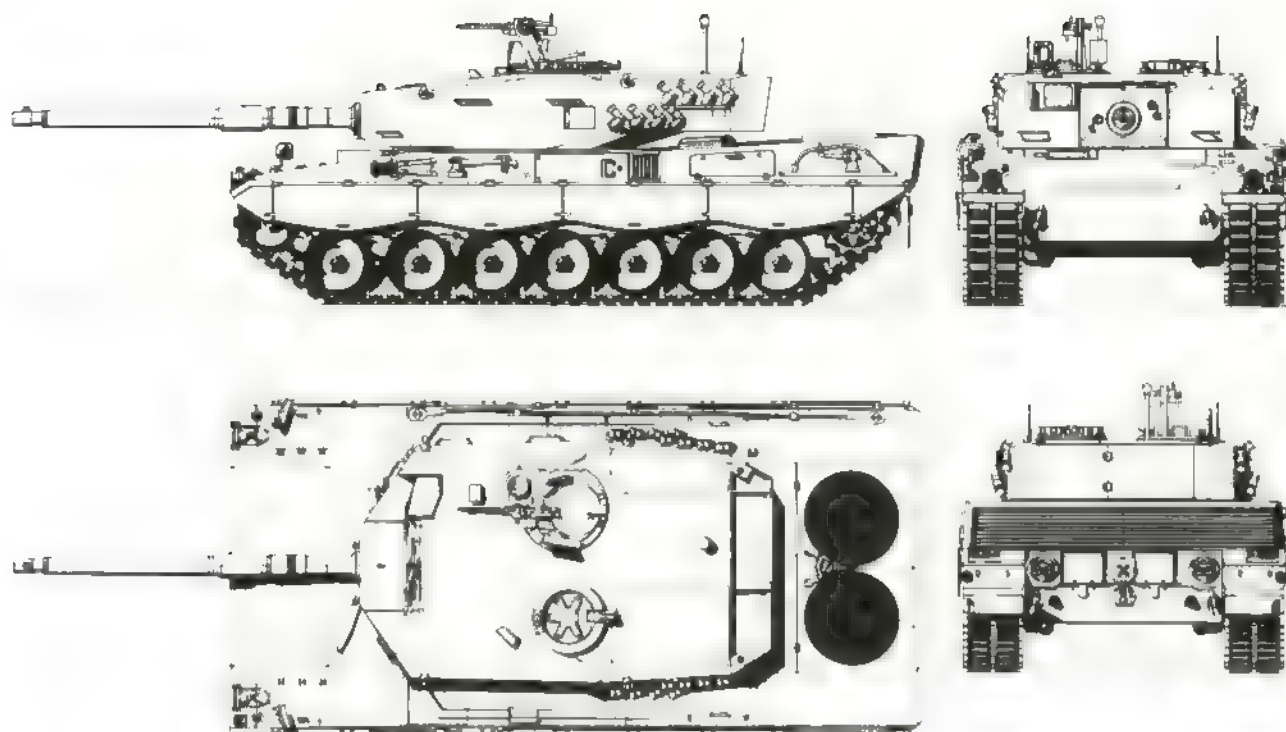
Secondly, the Threat has become more efficient and powerful in the field of MBTs, qualitatively and quan-

titatively. Within German MOD circles, there is no time to waste before the Seventh Army gets its first allocations of *XM-1*s.

Thirdly, Bonn stands more or less alone to face the red steel menace, a factual emergency which boils down to a situation materially identical to the inferno prevailing 35 years ago between the Red Army and the Wehrmacht, mug to mug. The empirical reality is that two foremost tank knowledgeable nations are once again rubbing respective armored strategies and technologies, their mates recessed as second grade bystanders...

Nearly everything has been said on the technical perfections of the *Leopard 2*, to the extent German industry complain bitterly that the juicy data on their combat vehicle has been transmitted to the U.S.A. on a one way street direction from east to west... Specialized writers have thrashed out all aspects of the new German tank development with a great deal of tomtom. Only electronics and artillery performances remain a classified domain to date...





LEOPARD 2AV—PROTOTYPE 19/T-19 TECHNICAL DATA

Dimensions

Total length w/gun at horizontal position	9.72-m
Length of chassis, track or track	7.40-m
Total width at track skirt	3.54-m
Height to roof of turret	2.45-m
Turret height	0.83-m
Turret width	2.55-m
Height to roof of chassis at rear	1.79-m
Ground clearance aft of chassis	0.50-m
Width of track	0.63-m
Track length on the ground	5.03-m

Weights

Combat weight with 105-mm weapon system	±54,100-kg
With 120-mm weapon system (turret is optimally designed for the 120-mm gun)	±54,600-kg

Engine

MTU MB 873 Ka 500 diesel, multifuel, 12 cylinders, weight	2,360-kg
Engine power output	1,500 DIN h.p.
Fuel tank capacity (as compared to 1,000 l. in Leo I)	1,320 l.
Maximum road speed	68 km/h.
Maximum cross-country speed ..	55 km/h.
Maximum gradient	66%
Unit footprint pressure	0.85 kg/cm ²
Standard change of engine performed in 12 to 15 minutes	

Transmission

HSWL 354/4 hydromechanical modular planet gear box with combined hydrodynamic/mechanical brakes.

Running Gear

Torsion bars dia. 69-mm
Volute spring bump stop—friction damper (position 1, 2, 3, 6 & 7) double road wheels: 7 on each side—return rollers: 4 on each side—11 tooth sprocket—track type: cast steel, double pin, rubber brushed

Electrical Systems and Batteries

24 Vdc/20 kW—8/12V/125 Ah

Armament

Main gun on T-19 turret .. 105-mm rifled (L7 A3) 51 ca (12 rounds in turret, 28 in chassis).

Main gun on T-20 turret 120-mm smooth bore (12 KE and multipurpose rounds in turret, 28 in chassis)

Secondary weapons

Loader's weapon (-15°+65° elevation) . . . 7 62-mm
Coaxial MG3 cal. 7.62-mm
Grenade launcher 8 smoke, 8 fragmentation

Aiming Device

Gunner's primary sight (GPS)—Integrated Hughes laser rangefinder—Commander's stabilized line of sight 360° periscope (PERI-R12S2)—FERO-Z-16 Mod gunner's auxiliary telescope—Day and night driving optics—Growth for thermal temperature sight (TTS) for gunner and commander—Integrated controls and gunner's eyepiece displays

Crew

Commander, driver, loader, gunner 4

Miscellaneous

CBR unit with fresh air ventilation system—Escape hatch from floor of chassis—Heating system—Bilge system—Automatic fire extinguisher system in engine compartment ▲

NEW U.S. ROCKET LAUNCHER SYSTEM

A new rocket launcher system, designated the *Surface Launch Unit, Fuel Air Explosive (SLUFAE)*, is under development by the U.S. Army and Navy. It will be employed by combat engineers to breach minefields in support of armor and infantry attacks and in pursuit operations.

Consisting of a 30-tube armored launcher mounted on the *M-548* full-tracked cargo carrier, the quick response, all weather, day or night system fires a fuel air explosive warhead that can breach minefields from defilade or concealed positions at distances up to 1,000 meters.

The Army's Missile Command is developing the launcher, shipping container, and fire control equipment, and probably will assume program management once the system goes into production. The Mobility Equipment Research and Development Center at Fort Belvoir, Virginia, has overall responsibility for program management at the present time. The rocket motor and round is being developed at the Naval Weapons Center at China Lake, California, while the Naval Surface Weapons Center at White Oak, Maryland, is developing the fuzing system.

Fuel air explosive munitions employ foliage discriminating fuzes that actuate on target contact and disperse highly volatile liquid chemicals into aerosol clouds. Subsequent detonation of the clouds produces an overpressure that neutralizes or detonates landmines and explosive booby traps.

The launcher can fire single rounds or ripple fire all or any selected number of the 30 rounds.

PLAQUE PRESENTED TO PATTON MUSEUM

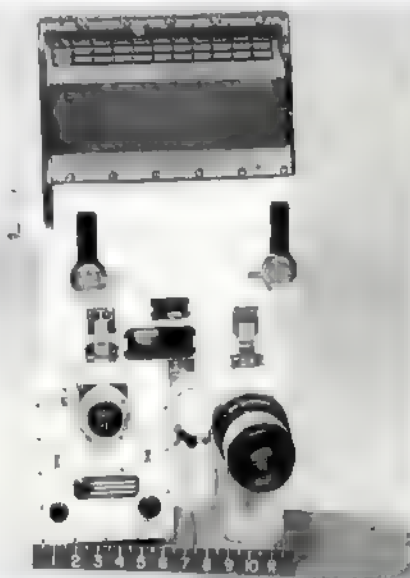
A plaque has been erected on the balcony entrance of Phase II of the Patton Museum on behalf of the members of the 6th Armored Division Association. The plaque honors the Association for their donation of \$5,000 toward the Cavalry Armor Foundation.

Ms. Martha L. Davis, President of the Cavalry Armor Foundation, was present when Major General John W. McNery, Commander of the U.S. Army Armor Center thanked Major General (Retired) Robert Grow for his division's association support of Armor's continuing mission. General Grow commanded the 6th Armored Division under Lieutenant General George S. Patton, Jr. during WW II.

LASER INTEGRATED PERISCOPE

Undergoing testing at the U.S. Army Armor and Engineer Board, Fort Knox, is the *Laser Integrated Periscope (LIP)*. The *LIP*, developed by Frankfort Arsenal, is a combination of a modified *M-32* periscope daylight elbow and internal electronic components similar to the handheld laser rangefinder. The laser is a single pulse Neodymium YAG, with an operational range of 450 to 5,000 meters, and a sustained activation rate of one pulse per second. The beam divergence of .25 mils (maximum) is expected to minimize the number of multiple returns during operational ranging.

The *LIP* is designed for use on *M-48/M-60* tanks in conjunction with the improved image intensification night sights in order to improve passive night fighting capability. A probable secondary benefit will be improvement of ranging accuracy over the *M-17A1* coincidence rangefinder when used during the day.



SYNTHETIC OIL DEVELOPMENT PROMISING

The Mobility Equipment Research and Development Command (MERADCOM) is currently conducting research on synthetic and conventional oils for year-round use.

Preliminary tests in the Army and private industry show that synthetic oils have great potential as a year-round lubricant and may eliminate the seasonal oil change. Some tests show that the useful life of syn-

thetic oils far exceeds that of conventional petroleum-based oils.

The Army has used synthetic oils since the late 1960s in cold climates such as Alaska. Synthetic oils were more effective than conventional oils and even showed promise as a year-round oil.

While petroleum oils are pumped out of the ground and refined, synthetic oils are manufactured by a chemical process using such diverse products as natural gas, and even animal or vegetable matter. Its use could significantly reduce the nation's reliance on imported oil.

Army interest is in the cost savings that could be

realized from having to stock only one engine oil and having to make fewer oil changes. While initial cost is expected to be higher, its longer life and less frequent changes would generate savings in dollars and manpower.

Some indications point to the prospect of not having to change oil at all. Additional oil will have to be added as the engine burns it up. Also the synthetic oil does not break down with extended use.

There are a number of synthetic oils on the market today, but the Department of the Army believes there has, thus far, been insufficient evidence of their reliability, particularly in combat.



PRODUCT IMPROVED M-48A5

The U.S. Army Armor and Engineer Board, Fort Knox, is currently evaluating a product improvement (PI) package for the M-48A5 tank. Major items under test are a low-profile commander's cupola, mounts for M-60D machineguns at both the TC and loader's stations, and improved stowage for main gun ammunition.

The low-profile cupola features a four-position hatch

which affords the commander overhead protection, yet allows unobstructed direct vision to the front and side. The external machineguns are M-60D's, which were originally developed as helicopter door guns. The improved main gun ammunition racks provide stowage for 54 rounds, an increase from the 43 rounds currently carried.

EXECUTIVE COUNCIL MEETING

The Armor Association Executive Council met at Fort Knox on 9 September. The Association president MG John K. Boles, USA (Retired) presided over the council of 18 officers and NCO's. Topics of discussion included plans for the 1977 annual meeting to be held in May at Fort Knox, (the 1976 annual meeting was cancelled at

Fort Hood due to a misinterpretation of Army regulations), the awards program and ways to increase membership. Members interested in establishing new chapters or desiring to have a copy of the minutes of the council meeting may write to the Association.

THE SOVIET SOLDIER: SOVIET MILITARY MANAGEMENT AT THE TROOP LEVEL

by Herbert Goldhamer. Crane, Russak, and Company, Inc. 352 pages 1975. \$17.00 (paper-bound \$8.75).

The October War thoroughly debunked the old saw that Soviet equipment is old and simple because the average peasant could handle nothing better. Indeed, the great shock of the war was the mass of Soviet equipment fielded and its sophistication. Moreover, the Arab soldier, heretofore maligned, proved himself a capable opponent due to his Soviet training.

What sort of soldier is the Soviet? Dr. Herbert Goldhamer, senior staff member of the Rand Corporation and member of the Rand Graduate Institute for Policy Studies, provides unclassified answers to this question. Through extensive research and analysis of Russian publications, the author draws a profile of the U.S.S.R. soldier and officer by describing his training, discipline, morale, and indoctrination.

His detailed description of training from pre-induction through discharge is most interesting to the military audiences. In particular, the difficulties of inducing twice a year and the impact on training and readiness will not be lost on the Western student.

The differences between the Communist bloc and the West impact throughout the military structure. Additional training is required to teach skills such as driving, which most Westerners acquire prior to induction into the military; mechanical and electronic skills transpose directly from civilian to military also, and require special preinduction training in Russia. The author describes these difficulties as they relate to the 2,000 military occupational specialties in the Armed Forces.

The structural or organizational difference due to the influence of the Communist Party and the presence of deputy commanders for political affairs at every level from company up will raise eyebrows in the West, but the author's analysis of the Party's influence on initiative, command structure, and impact on the future are highpoints in the book.

While the author properly destroys the myth of the ten-foot tall Russian soldier,

his description of him shows him to be a formidable opponent. Indeed, the minimum physical requirements of the 16-18 year old are enviable: 100 meter run—15.4 sec.; 1.5-km cross-country run—6 min; 700-gram grenade throw—31-m., etc.

Dr. Goldhamer has given us a readily understandable and jampacked encyclopedia of the Russian soldier. It should rank high on professional reading lists.

Colonel Corwin A. Mitchell
USATCA

INTERVENTION OR ABSTENTION Edited by Robin Higham. University Press of Kentucky, Lexington. 1975. 221 pages. \$14.75.

Intervention or Abstinence is a timely book considering the country's recent involvement in Vietnam. The book is actually a collection of 11 essays that critically examine American Foreign Policy during this century. (The essay on Naval intervention goes back even earlier.) The editor's introduction summarizes the entire period and is extremely well written.

Kenneth J. Hagan, Assistant Professor at the U. S. Naval Academy, provides the "Historical Significance of American Naval Intervention." Janice J. Terry, Associate Professor of History at Eastern Michigan University, also coeditor of *The Arab World*, contributes "The Consequences of Economic Abstinence: The Aswan Dam." Norman A. Graebner, Professor of Modern American History at the University of Virginia, analyses the American policy in the "Manchurian Crisis, 1931-1932." Donald J. Mrozell, Assistant Professor of American Military History at Kansas State University, examines "Surrogate Intervention: Alliances and Air Power in the Vietnam War." Other areas reviewed include American economic intervention in Peru and Chile, abstention in the India-Pakistan dispute, domestic desire for abstention in Vietnam, involvement in Korea, intervention in Greece, the domestic pressure for intervention in Palestine, and a comparison of intervention in Mexico in 1914 with Dominican Republic in 1965.

Combined, these well written essays vividly point out that American Foreign Policy has been inconsistent, not only from region to region but sometimes from

one country to another in the same part of the world. The theme is that a planned approach to Foreign Affairs would be more valuable than the ad hoc procedures of the past.

The Late Colonel Carl M. Putnam

THE GREAT TANKS by Chris Ellis and Peter Chamberlain. Hamlyn Publishing Group. 176 pages. 1975. \$10.50.

Tanks have long held a justifiable fascination for armored buffs and students of military history, but their popularity has never been as great as at present, and in the past 5 years there has appeared a virtual flood of lavishly illustrated books on the subject. Most of these volumes tend to pursue historical lines, either by tracing a chronological sequence from World War I to the present, or by restricting their scope to a treatment of a particular time period or nation. *The Great Tanks* adopts a somewhat different, more sophisticated—and more limited—approach. It attempts a diagnostic analysis of 12 "families" of tanks, demonstrating the development of successful results in design and performance through the incorporation and adaptation of the fundamental principles and structural layout.

"In the starkest terms," note the authors in their foreword, "there have only been three or so key designs which have inspired everything else." This book follows the development of these key designs—"Mother" with its classic rhomboid shape; the Renault, which established the basic layout of subsequent tanks; and the Christie design which spawned the Russian line—into the more recent armored leviathans that dominate the modern battlefield.

As in their earlier works, *Pictorial History of Tanks of the World 1915-45* (Stackpole, 1972) and *Fighting Vehicles* (Hamlyn, 1972), Chamberlain and Ellis have teamed up to provide an authoritative, analytical, but never dry text, as well as a copious and impressive collection of photographs, many in vivid color, that will enhance any military bookshelf. They also provide cutaway and elevation drawings, tank specification tables, and a useful glossary.

The title of the book is slightly mislead-

ing, since the scheme of presentation has obliged the authors to omit a few supposedly "great" tanks which did not directly carry on the basic line of development, and which might be considered "collateral branches" of the armored "family tree." A more serious objection is the lamentable absence of an index or concordance for easy cross-reference. Such features were a valuable inclusion in the earlier tank books of these authors.

The Great Tanks is well worth reading and will undoubtedly serve as a handy and informative reference tool for some time. I heartily commend it to all armored enthusiasts and military readers.

Captain Leonard A. Curchin
Royal Canadian Armoured Corps

THE BUFFALO WAR by James L. Haley. Doubleday & Co., Inc., New York. 1976. 280 pages. \$7.95.

DEATH SONG by John E. Weems. Doubleday & Co., Inc., New York. 1976. 311 pages. \$10.95.

These two books, published simultaneously by Doubleday and covering related subject matter, have intriguing similarities and differences. Both are very readable and interesting, but it is their incongruities that impact most on the reader.

Of the two, *The Buffalo War* is probably the better overall and certainly the better buy. It has clarity, an explicitness,

and a depth not found in *Death Song*. James Haley's first book, *The Buffalo War* clearly shows his careful, often painstaking effort given to original research. He has assembled a considerable bibliography containing numerous previously unpublished reports, letters and manuscripts, and his text is meticulously referenced.

His theme orients on the great buffalo herds of the midwestern plains, the Indians' dependency on those herds, and how the inexorable expansion of the hunters and settlers abetted by the railroads led to unavoidable hostilities. Haley was careful to confine his subject to a relatively narrow field and this constraint permits considerable detail.

The book deals with the 1874 uprising of the Kiowa, Cheyenne, and Comanche tribes following repeated violations by whites of the Treaty of 1868. The first part goes a bit slowly, but the tempo and interest pick up after the background is established and the primary characters identified. The book ends with the successful but merciless cavalry campaigns of 1875 that broke the back of the uprising.

The book is not without flaws. Haley tends to see only one side of people and tries to force them into rigid categories. You begin to get the impression that all Indians were honorable and Simon-pure, that all soldiers were barbarous racists, that all low level government agents were singularly dedicated to their charges and all high level agents were emotionless bureaucrats. There are a few minor military "glitches"—incorrect rank, wrong unit strength, riflemen steadily hitting targets 1,000 yards away, and an alert horse that obligingly stopped to let a cannonball whiz harmlessly by. There is an almost malicious slander of Ronald

Mackenzie which is partially refuted in the notes, but then worsened when Haley attempts to smear Mackenzie by association with a completely unrelated incident involving his father years before. But these are essentially irritating gnats in a picnic of enjoyable, well described American history. Despite his occasional anti-Army bias, Haley has written an interesting, thorough and sympathetic story of a period that has received little attention. Both soldiers and history buffs will enjoy it.

John Weems' *Death Song* is possibly more readable than Haley's book, but it differs significantly. Weems is an experienced author and, for the most part, has a smoother, more engrossing manuscript.

Weems had broadened his subject considerably looking at the terminal years of the Indian Wars from 1867 to the death of Quanah Parker in 1911. He covers the full sweep of western plains Indians from Montana and North Dakota to Arizona and Texas, from Sioux, Cheyenne, and Comanche to Kiowa, Arapahoe, and Apache. He gives greater space to selected individuals because of their newsworthy prominence at the time or because of their own subsequent articles. While sympathetic to the plight of the Indians, Weems offers a fairly objective and realistic appraisal of both sides, observing that there were nobles and scoundrels on each and a lot of others in between. He shows how these lives and others less famous were woven together, touching each other at various times and carrying impacts that were felt years later and miles away. He shows how the inevitable clash of divergent cultures and value systems led to vengefulness and bitterness that the years have yet to fade away.

But, because this fast moving narrative is only 271 pages long (a bit slim for the price), it doesn't include the detail or depth of Haley's book, nor is it nearly as thorough on those points it does cover. While it is more than adequate for a general understanding, it is often cursory and shallow as history.

Weems leans heavily on the writings of others, possibly too much so; some parts read remarkably like the source material and the whole text reads more like a well edited assemblage of excerpts from other authors than original writing. A particularly interesting part of the book is at the end where Weems describes what eventually happened to the various major characters in this real-life drama after the fighting finally stopped. This is possibly the best part of the entire book.

Colonel (Retired) John R. Byers

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INCREASED CIRCULATION

Beginning with this issue, the free distribution of **ARMOR** has been increased significantly to include units and agencies that have not received the magazine in the past. As a matter of expediency, many headquarters from battalion to army level will be receiving the November-December issue in bulk for further breakdown to staff and special staff sections. As soon as the mailing list can be reprogrammed, the method of distribution will be changed so that copies of the magazine are mailed directly to the staff sections or branches of a unit.

This increase in circulation is being made in the interest of keeping all ele-

ments of the combined-arms team informed of **Armor's** role in combined-arms operations, now and in the future.

Although the new circulation will cost only a relatively small amount, it is essential that the free copies of the magazine be kept within realistic bounds. Therefore, commanders of units receiving the magazine are requested to inform us as to whether or not the copies being received are in excess of the unit's needs.

Free copies of **ARMOR** are intended for use in offices and day rooms. Individual copies of the magazine may be obtained through subscription. For details see page 1. ED.

RECOGNITION QUIZ ANSWERS:

1) French—AMX-30 2) Soviet—ASU-85 3) Dutch—YP-408 4) Japan—Type 60, SP-106 5) Austria—Cuirrassier.
NOTE: if you answered AMX-13, you were partly right—the Cuirrassier uses the AMX-13's turret.

Coming in **ARMOR**

"THE DEVELOPMENT OF SOVIET ARMOR DOCTRINE 1917-1941"

In his discussion of early Soviet armor doctrine, Major Jeffrey Greenhut, surmises that, "The ultimate direction of the Soviet military system was established as a result of the close contact between the Soviet regime and the army of Weimar Germany."

"REFLECTIONS"

*Lieutenant General Donn A. Starry answers some of the questions about Armor's role in the Vietnam conflict in a preview of Chapter IX of the monograph, **Mounted Combat in Vietnam**.*

"TANKS AGAINST A BEACHHEAD"

Brigadier General S. R. Hinds, USA-Retired describes a doctrine for counterattacking a beachhead with tanks which was developed during maneuvers in Hawaii in the early thirties.

"THE M-60 FOREVER"

*In the next **The Commander's Hatch**, Major General John W. McEnergy reminds us that the M-60 will be with us into the next century and outlines expected improvements in the coming years.*